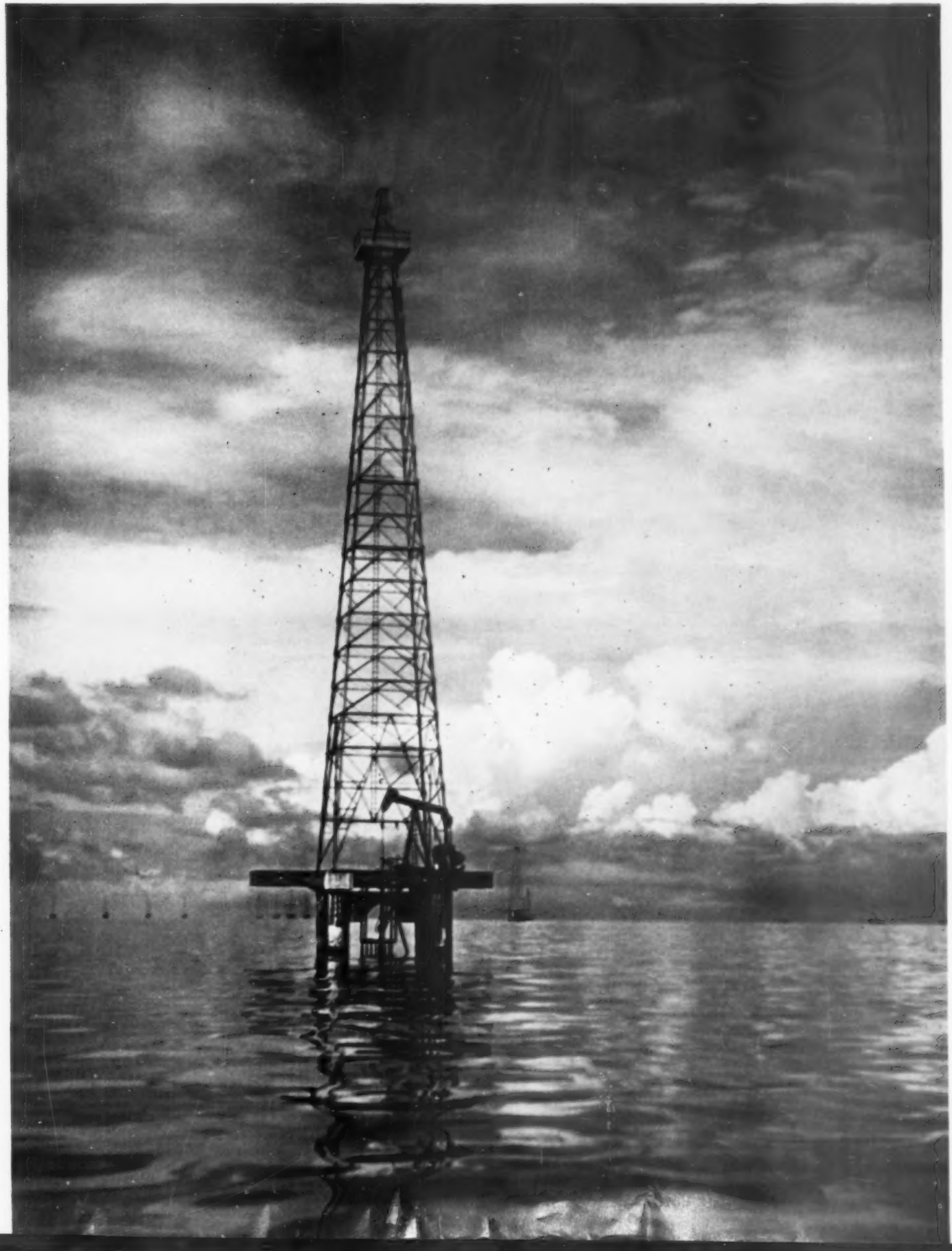
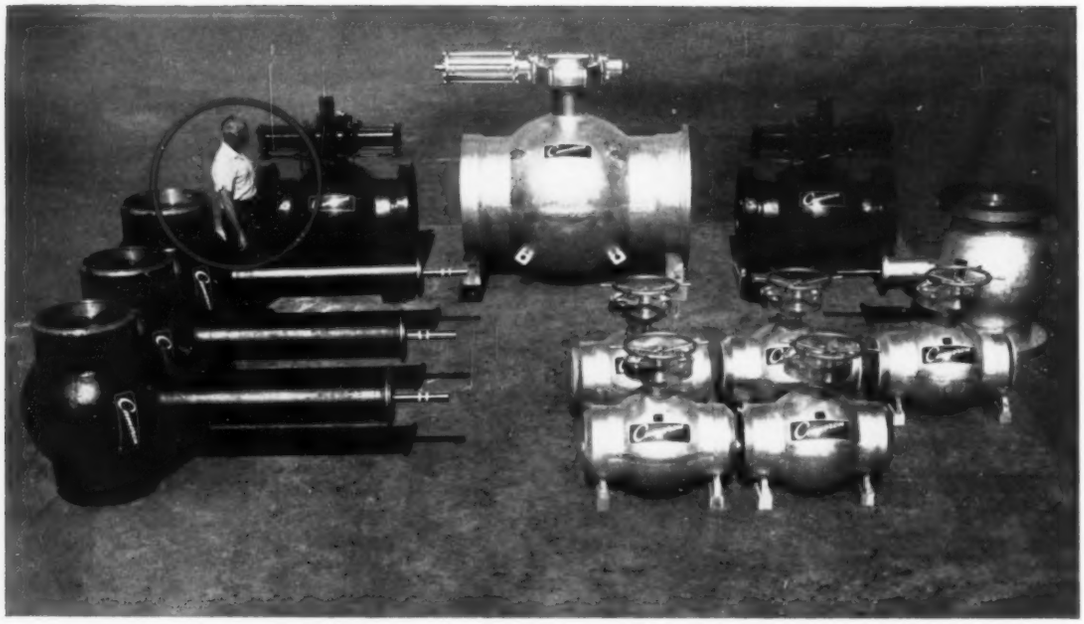
WORLD PETROLEUM

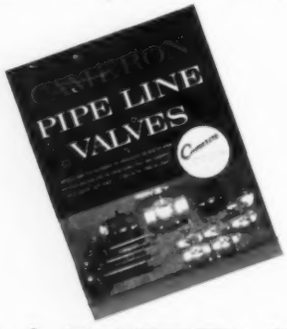
DECEMBER, 1961





ACCEPTED BY PIPE LINES

Cameron Ball Valves are winning increasing acceptance by pipe line companies the world over. The companies like the compact design, the simplicity and the light weight in comparison with conventional valves. Cameron Ball Valves are easier to handle and easier to coat than conventional valves. There are no bonnets or glands to leak, and no lubrication is required either for sealing or to reduce friction in operating the valve. Torque required to operate the valve is amazingly low because the pressure of fluid against the ball is carried by low friction Teflon bearings, and the seat ring area in contact with the ball is small. A tight shutoff for countless operations is insured by the rotating seat design.

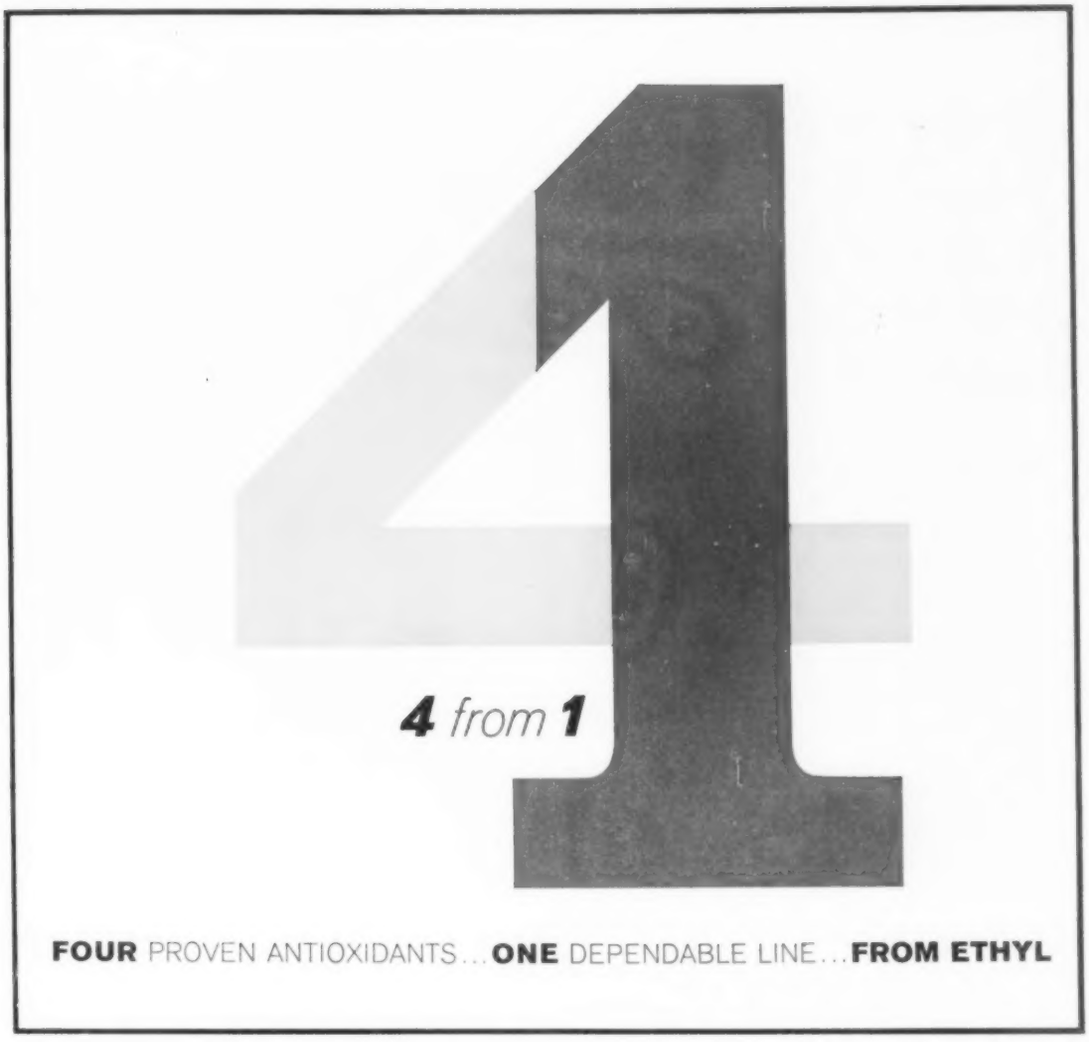


Ask a Cameron representative or write for a pipe line valve catalog.

Cameron

CAMERON IRON WORKS, INC.
P. O. BOX 1212 • HOUSTON, TEXAS

CAMERON BALL VALVES



Ethyl offers you four versatile products, specifically tailored to meet your antioxidant needs.

702 minimizes oxidation of crankcase oils in gasoline and diesel engines. Adds anti-wear properties while reducing corrosive attack on silver and copper alloy bearings. Ashless, non-volatile, non-sludging . . . works well with the increasingly popular ashless detergents.

703 increases oxidation stability in synthetic jet engine oils, greases and specialty lubricants. Also imparts color stability, alkalinity and anti-rust qualities.

733 is particularly effective in stabilizing automotive gasolines, aviation gasolines, jet fuels and industrial oils. Does not contribute to induction system deposits. Easy-to-handle liquid form. Economical, too . . . some refiners report savings up to 50%.

ZDP inhibits oxidation in a wide range of lubricating oils. Acts as a mild extreme pressure additive to hold down cam and lifter wear.

All are part of Ethyl's growing family of chemicals designed to improve the quality and lower the cost of your petroleum products. For detailed information on Ethyl products and service, write:

ETHYL CHEMICALS — ETHYL CORPORATION

ETHYL U.S.A.

ETHYL CORPORATION, 100 PARK AVE., NEW YORK 17, N.Y., U.S.A.

20,000 B/SD delayed coker on stream for Mobil Oil Co. at Beaumont, Texas

CHARGES MIXTURE OF SWEET AND SOUR CRUDE RESIDUA

The new 20,000 barrel per stream day delayed coking unit – designed, engineered and constructed by The Lummus Company for Mobil Oil Company at their Beaumont, Texas Refinery – is on its initial run after very smooth start-up operations.

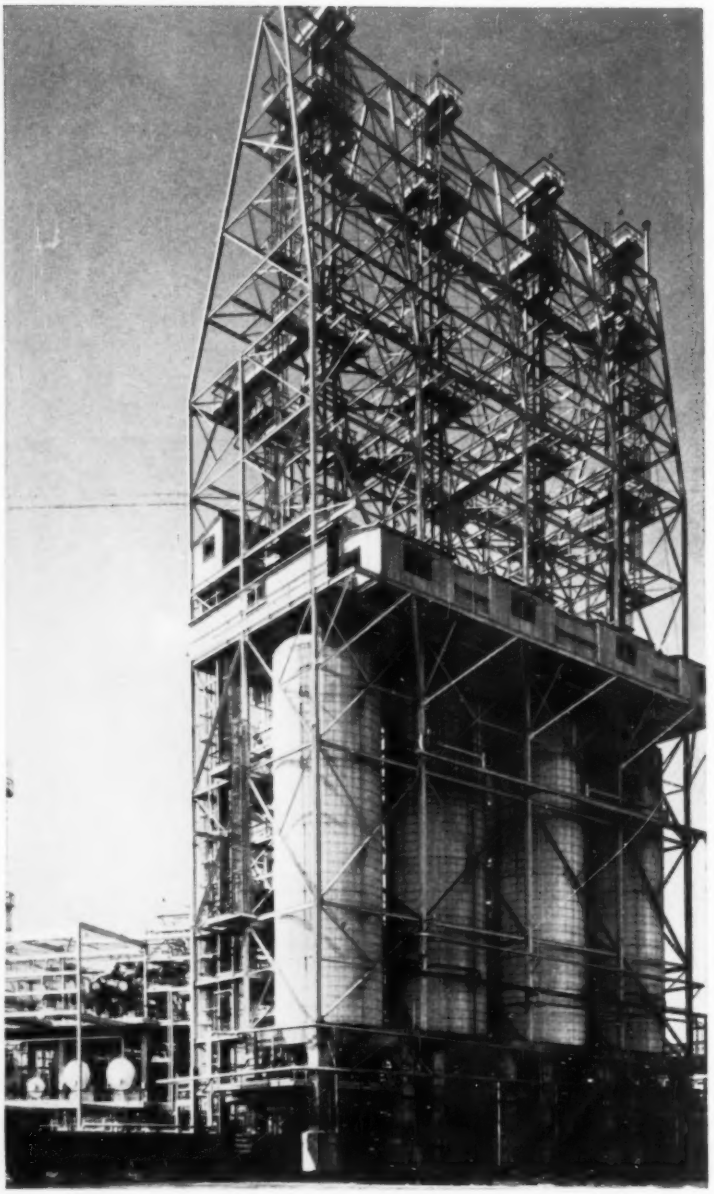
The Coker, comprising 4 coke drums each of 19 feet in diameter by 63 feet tangent to tangent, is designed for 732 tons of coke per stream day.

The feedstock is a mixture of sweet and sour reduced crudes cut back with naphtha to reduce the viscosity of the heavy residuum without the necessity of heating long lines. The unit includes a pre-flash section to separate the naphtha cutter stock from the heavy residuum before charging to the coking section.

The coker makes 5 products besides coke: gas, debutanized gasoline, light naphtha, and light and heavy gas oils.

Coke, which is hydraulically cut from the coke drums, is dropped directly into gondola railroad cars for final shipment.

A unique blow-down system conceived by Mobil has been incorporated for greater efficiency in recovering oil which has been stripped from the coke in the drum.



This is the 14th delayed coking unit engineered and constructed by Lummus. Lummus has built over 30% of the total existing delayed coking capacity in the United States.

LUMMUS®

THE LUMMUS COMPANY, 385 Madison Avenue, New York 17, New York, Houston, Washington, D. C., Montreal, London, Paris, The Hague, Madrid; Engineering Development Center: Newark, New Jersey.

WORLD PETROLEUM FOR DECEMBER, 1961, Vol. 32, No. 13. December, 1961. WORLD PETROLEUM is published monthly except semi-monthly in July by Mona Palmer, trustee under the will of Russell Palmer, 109 Market Pl., Baltimore, Md. Editorial and executive offices, 25 West 45th St., New York 36, N. Y. Controlled circulation postage paid at Baltimore, Md. Subscription rate: $10.00 per year. Single Copies $1.00.

FOUNDED BY RUSSELL PALMER

Publisher MONA PALMER
Managing Director J. C. CHATFIELD
Editor G. H. BARROWS
Processing Editor WILLIAM C. UHL
European Editor CECIL W. WOOD
Sales Manager RUSSELL PALMER
Production Manager DORIS N. O'HARA
Art Director CHARLOTTE BLASS

Member of National Business Publications, Inc., and Business Publications Audit of Circulation, Inc.

SUBSCRIPTIONS

1 year, $10.00 2 years, $18.00
3 years, $25.00 Single copies $1.00

GENERAL OFFICES

25 West 45th St., New York 36
(Tel. JUdson 6-4820)

BRANCH OFFICES

EUROPEAN OFFICE ZURICH, SWITZERLAND
Dr. F. Forster von Lenz
Dr. h.c. J. Zurkirchen
231 Forchstrasse
(Tel. 24-79-93)

ENGLAND AND NETHERLANDS OFFICE
LONDON, ENGLAND
G. L. Fetherstonhaugh, St. Paul's Corner,
Ludgate Hill, London, E.C.4.
(Tel. CITY 5318)

TORONTO 1, ONT., CANADA
Allin Associates Suite 1019, 2 Carlton St.
(Tel. EMpire 4-2269)

MONTREAL P.Q., CANADA
Allin Associates 2055 Mountain St.
(Tel. Victor 5-6898)

TOKYO, JAPAN
Katsunari Toyoda, 4-2604 Hon-cho
Koganei-Shi

WASHINGTON, D. C.
J. B. Huttlinger National Press Building
14th and F Streets (Tel. EX. 3-3733)

LOS ANGELES 14
T. T. Drake 412 West Sixth St.
(Tel. MAdison 8-1391)

TULSA 3
Jack F. Cozier
605 Mayo Bldg. (Tel. LUther 4-6335)

World Petroleum is published by
Mona Palmer, Trustee
under the will of Russell Palmer
© Mona Palmer, Trustee, 1961

VOL. 32, NO. 13, DECEMBER, 1961

World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

CONTENTS

4 Washington Pipeline, *by Joseph B. Huttlinger*

8 London Letter, *by Cecil W. Wood*

28 Processing Review, *by William C. Uhl*

35 Editorial—Maturity in Oil

36 Colombia's Oil Looks Up, *by E. Ospina-Racines*

39 Sixth World Petroleum Congress Planned for Frankfurt in 1963

40 Bolivia Spurs Activity in Western South America, *by Dr. Juan Rassmuss*

45 Mapele Discovery Aids Brazil's Exploration

47 Paraguay Invites Oil Help, *by Ricardo Mazo*

48 "Mudpie" Provides New Method for Storing Liquefied Gases

50 Libya Enters the Oil Age

53 World's First Large Hydeal Unit was Fast Construction Project

56 Australian Refinery Operators Will Use New Training Device

64 Oil Company Staff Changes

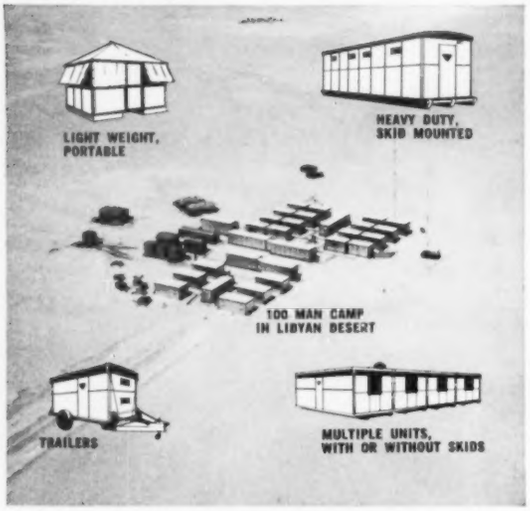
70 International News and Notes

88 WORLD PETROLEUM Editorial Index, Vol. 32, 1961.

98 Advertisers' Index

THIS MONTH'S COVER

This well is producing from the Western Hemisphere's largest oil field—the fabulous Lake Maracaibo of Venezuela. Creole Petroleum Corp. is the well's owner, and thanks for this lovely photograph go to Creole's parent, Standard Oil Co. (New Jersey).


LIGHT WEIGHT, PORTABLE
HEAVY DUTY, SKID MOUNTED
100 MAN CAMP IN LIBYAN DESERT
TRAILERS
MULTIPLE UNITS, WITH OR WITHOUT SKIDS

LOW COST, RUGGED FIELD HOUSING

Fast delivery • Save up to 80% on freight • Skid or wheel mounted • World's leading camp outfitters • Write:

PORTA-KAMP HOUSTON

PORTA-KAMP MANUFACTURING CO., INC.

3601 West 12th Houston, Texas

Cable: PortaKamp, Houston

LET GEOLOGRAPH HELP YOU FIND THE PAY SAND

The Geograph Recorder is of great assistance in locating Pay Sands, determining Effective Pay Thickness, and showing sections of greater Porosity.

From India to Texas the Geograph Recorder is furnishing the finest Mechanical Well Logging records available. Wherever oil is found, Geograph is helping to find it.

Let GEOLOGRAPH Help You.

For Sale Outside the United States and Canada

THE GEOLOGRAPH COMPANY ®

MANUFACTURERS ● EXPORTERS

27 N.E. 27TH • P.O. BOX 1291 • OKLAHOMA CITY 1, OKLA.

by Joseph B. Huttlinger

Crude from Canada a Growing Problem

The rising flow of Canadian crude oil to the United States is turning out to be the crucial problem in the new oil import program being shaped at the U. S. Department of the Interior.

The flow has risen from 55,000 b/d in 1955 to 113,000 b/d in 1960 and to a new record of 198,532 b/d in August of this year. While the increases have been both to the U. S. West Coast and the Midwest, it is the flow to the Midwest that is hurting U. S. oil producers. Imports to the West Coast merely displace imports from other sources. Imports to districts one through four, which includes the Midwest, are over and above other crude oil imports.

U. S. officials are frank to say that they are disappointed at the rise in the flow from Canada, and Secretary of the Interior Stewart L. Udall now explains "they have gone up much faster than we had anticipated" last February after a conference with Canadian officials.

The U. S. has several ways to deal with Canadian oil imports in the program, due to be announced next month. One would be to continue allowing imports to districts one through four in unlimited volume, on top of other imports. This would hurt Midwest producers the most, Texas and Oklahoma producers less.

Or, the U. S. could count all Canadian imports as part of the total allowed imports, so that any Canadian oil coming in would displace oil from Venezuela and elsewhere. Some U. S. producers have urged this.

A middle course is winning more support, however. Under this, the U. S. would take two steps. First, it would count in the overall totals the increase in Canadian imports from 1960 to the estimated imports in 1962. Second, it would work out a gentlemen's agreement with Canadian officials to hold the rise in imports to a reasonable level.

Secretary Udall hinted at the second part of this course when he said, "I think we can reach some agreement that will stabilize the situation." He admits the Canadian situation is causing "very considerable concern." Under Canadian laws, the government can curb exports of crude oil.

While the Canadian problem still is to be worked out, other phases of the new crude oil and oil product program are falling into place. U. S. officials now indicate that total oil imports will be slashed further, perhaps by 50,000 b/d. Otherwise, the new program will be a continuation of the present one, with historic importers losing some of their quotas, and smaller refiners still getting a break.

The need for a slash in imports was emphasized in new figures from the Independent Petroleum Association of America showing a further drop in the wholesale price of the four major oil products.

The price for the four fell to $3.77 a barrel in September, down eight cents in a month and 23 cents below a year ago. IPAA sees this as evidence there is too much oil in the U. S., and prefers the cutback to come in imports rather than in U. S. output which already is barely holding its own from a year ago.

FPC Studies Huge Natural Gas Sale

The oil and gas industry is watching a huge new proposal, involving sale of 6.6 trillion cubic feet of natural gas, to see if the Federal Power Commission can keep its promise to speed up its actions.

The deal involves perhaps the largest sale of natural gas in the history of the industry. Humble Oil and Refining Co. of Houston, Texas, has agreed to sell leasehold interests in 6.6 trillion cubic ft of gas, much of it under the King Ranch in Texas, to Monterey Gas Transmission Co. of Houston, Texas.

Monterey will pay $940,370,155, about 14c per mcf, in two bites spread over a span of years. Monterey will carry the gas to Alexandria, La., through a new pipe line, and deliver it there to United Fuel Gas Co. for use in the Columbia Gas System.

Monerey is a new company, owned 48% by Humble. President is John R.

Pipeline

McMillan, who also is a director. It plans to build 216 miles of 30-inch gas line to Alexandria for $32.8 million and to buy 330 miles from Humble for $27 million.

Columbia Gulf Transmission Co. of Houston, Texas, plans 391 miles of 30-inch loop lines and 79,900 hp of compressor capacity for $67 million to receive the gas. United Fuel Gas Co. plans 30 miles of 20-inch, 26-inch and 30-inch line and 17,100 hp of compressor capacity for $21.8 million; Kentucky Gas Transmission Corp. plans 25.5 miles of 30-inch loop and 1,760 hp of compressor capacity for $17,325,700; and Ohio Fuel Gas Co. of Columbus, Ohio, plans 15.2 miles of 20-inch.

The application was filed with FPC Oct. 9. If things move quickly, hearings could be started before the end of the year and an examiner's report could come a few months later. By next summer, the full commission could have given its blessing to the huge project. On the other hand, if the companies fail to push ahead, or if the commission gets bogged down in paper work and legal maneuvers, it could be an extra year or several years before the project has a commission go ahead.

FPC Heeds Federal Courts

The Federal Power Commission is trying to get along with the U. S. courts and judges. In whacking two cents off the area price it proposes for Southern Louisiana, it said the cut is because four U. S. Courts of Appeals said it is too high. If the courts feel this way, said the FPC, it is "contrary to the public interest" for the FPC to hold otherwise. Anyway, said the FPC, it agrees that the first price gave "inadequate" protection to consumers.

The FPC action was unanimous in this, its first slash in area prices since they were announced September, 1960. FPC cut the price from 23.25 ¢/mcf including Louisiana taxes to 21.25¢. The tax is about 2.3¢. FPC set 19.5¢ for sales from the federal offshore areas which are beyond reach of the state tax.

This leaves a differential, at least on paper, of about half a cent for producers in federal offshore areas, allowed as "an additional incentive" to find gas in the outer belt.

FPC explained its aims: "Our guiding purpose has been to arrive at a revised price which will enable the commission to hold the loan on new sales in the area at a level consistent with the public interest and, at the same time, to enable producers to obtain authorizations which provide them a reasonable basis for proceeding with their operations and furnishing needed supplies of gas."

Resid Import Allocations Told

About 48 importers have allocations to bring residual fuel oil to district one, the East Coast, but the lion's share of the total is in the hands of the ten biggest importers.

This is clear from new figures from the Oil Import Administration, which parceled out another 2,500,000 bbl, for a total of 168,422,855 bbl for the year that ends next March 30. The total is about 461,427 b/d. Here are the big ten residual oil importers, with the total barrels allocated them for the year: Standard Oil Co. (N. J.), 43,033,130; Texaco, Inc., 22,825,181; Hess, Inc., 16,074,850; Metropolitan Petroleum Co. (Pittston), 12,533,626; Shell Oil Co., 8,954,551; Standard Oil Co. (Ind.), 8,953,809; C. H. Sprague & Son Co., 8,878,480; Gulf Oil Corp., 3,744,948; New England Petroleum Corp., 3,519,333; White Fuel Co., Inc., 3,169,772.

Helium Price Raised

U. S. Bureau of Mines hiked the price of helium from $19 to $35 per mcf, effective Nov. 18. The increase was proposed last August, and drew one comment it would bring "hardship" to users. The bureau also has a schedule of service charges, including a $2.50 filling charge. New price is for government and private buyers. Aim is to get cash for the new helium plants the government is underwriting.

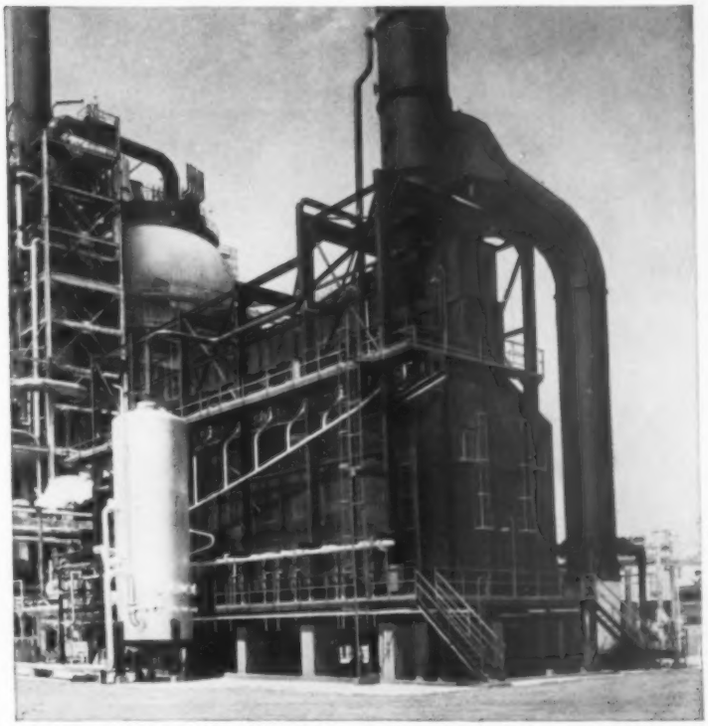
Southern California Market for Gas

The fighting gets rougher as Tennessee Gas Transmission Co. of Houston, Texas, tries to block plans of Colorado Interstate Gas Co. of Colorado Springs, to serve gas to the rich market in Southern California.

(Continued on page 96)

LUMMUS

ENGINEERS AND CONSTRUCTORS FOR INDUSTRY



Heater for Humble's Bayway Refinery, Linden, N. J. Large capacity, high thermal efficiency. Specially designed integrated heater, air preheater, auxiliaries and stack in compact design occupy minimum space.

Lummus Oil Heater for Humble's Bayway Refinery meets three tough design requirements

LARGE CAPACITY, HIGH EFFICIENCY, LONG RUNS

Humble Bayway knew exactly what they wanted in a replacement heater and turned confidently to Lummus to meet their difficult design requirements.

First, the heater had to be large enough to service this giant Cat-Cracker; now one of the largest in operation.

Secondly, Humble wanted a high thermal efficiency, 86% as compared with the usual 75-80%. In the Lummus design, the heater utilizes Ljungstrom Air Preheater and integrated blower and duct system to attain high thermal efficiency. Operating performance has been consistently high. Humble's big fuel savings have more than made up for the slightly higher capital investment for air preheat equipment.

Finally, there was one other difficult design condition. The new heater would be required to operate for long periods without shutting down for maintenance or cleaning. The Lummus design included steam soot blowers which have kept both the bare tubes and studded tube in the convection section clean. The heater fires on heavy residual fuel oil having a very high solids content.

Lummus designs horizontal and vertical tube oil heaters to any size from 100,000 to 300,000,000 BTU/Hour for any process, anywhere in the world. Because Lummus offers *every* type of oil heater, you can be sure that we will recommend the *right* unit for your needs. Consult with Lummus on your next oil heater—large or small.

THE LUMMUS COMPANY, Oil Heater Division, 385 Madison Avenue, New York 17, New York. Houston, Washington, D. C., Montreal, London, Paris. The Hague, Madrid; Newark, N. J.

CHAO PHRAYA RIVER, BANGKOK

CALTEX...

SERVING THE PETROLEUM NEEDS OF MORE THAN 70 COUNTRIES IN EUROPE, ASIA, AFRICA AND AUSTRALASIA

CALTEX

THE DAY WILL COME...

. . . when catalysts in bulk are delivered in the same efficient manner to Ketjen's present and future customers overseas as they are now being delivered to refineries all over Europe. It stands to reason that delivery in bulk saves both time and money, and with this in mind Ketjen has developed many spectacular bulk handling and transportation methods. Ketjen was the first producer in Europe to deliver fluid cracking catalysts in tank trucks and railroad tank cars equipped with the efficient Polysius system for pressure unloading at the rate of 40 tons per hour over a distance of 600 feet or more. Ketjen tank trucks and railroad tank cars cover 220,000 miles each year delivering catalysts to refineries in Europe. Besides the above methods of transportation, all Ketjen's customers can receive their catalysts in any manner they desire - the 5 ton containers (another Ketjen development), drums, multiwall paper bags or King Size containers. For geographical reasons, the problems of efficient delivery in bulk to customers in the Far East, Africa and other overseas areas are of a different nature. These problems were successfully solved when Ketjen developed the one trip King Size container. During the years that it has been employed it has proven easy to handle, light and strong, occupying a minimum of storage and shipping space.

If you have any special wishes for adapting the handling of catalysts to your local circumstances, we would welcome your information or suggestions on this fascinating subject. Please address your inquiries to: Catalysts Technical Service Department, Kon. Zwavelzuurfabrieken v/h KETJEN NV. P.O.B. 15c, Amsterdam, Netherlands.

KETJENCAT - KETJENFORM - KETJENFINE - CK 300

Sales office:

NEDERLANDSCH VERKOOPKANTOOR VOOR CHEMISCHE PRODUCTEN N.V.

63, Mauritskade, Amsterdam - Holland - P.O.B. 4038 - Tel. 54322 - Telex: 12270 - Telegrams: Chemicals

Murphy to Market "Murco" Gasoline

The Murphy Corp., USA independent, plans to market its own gasoline next spring at retail stations under the brand name "Murco." This will be done through the UK subsidiary, Murco Petroleum Ltd., registered as a private company last December with a nominal capital of £200,000 in £1 shares. Sales will be at the established regular prices.

Two stations have already been acquired to enable the company to gain experience of British methods and these are continuing to sell their established brands for the time being. It is aimed to have 10 stations by the time "Murco" brands are marketed and all stations acquired will gradually be rebuilt to a common distinctive design and will provide a high and extensive standard of service to the motorist. There is no intention so far to deal in motor oils nor to construct a refinery but extensive storage will be established in the Thames Estuary.

This British venture is Murphy's second development in Europe, the first being the recent formation of Svenska Murco Petroleum and the entry into the Swedish retail gasoline trade.

New ICI Plasticizer Alcohol

Tridecanol, a mixture of branched-chain C_{13} primary alcohols made at Billingham by the carbonylation of higher olefins, has been added to the sales range of Imperial Chemical Industries' heavy organic chemicals division. Its main use is in the manufacture of oil vixcosity-index improvers, plasticizers and detergents.

As a plasticizer alcohol, tridecanol is esterified to ditridecyl phthalate which, having a high molecular weight, is a low-cost replacement for polymeric plasticizers in specialized applications where properties such as low volatility and low migration are important. Both nonionic and anionic surface-active agents are made from tridecanol and are particularly suitable for the formulation of domestic and industrial liquid detergents.

Larger Tankers to Reach Fawley

Esso Petroleum Co. proposes to carry out dredging operations on the channel at the Nab Shoal off the east coast of the Isle of Wight and in the inner approaches to the Fawley refinery so as to permit tankers of 77,000 dwt and larger to reach the marine terminal in Southampton Water fully laden. Over 7 million cubic yards of spoil will have to be removed and the overall cost of the work is put at well over £1,000,000.

Ships proceeding to Fawley are now limited to 41 ft maximum draft at neap tides (43½ ft at mean spring tides) but the arrival draft, fully laden, of Esso's 77,000-dwt tankers now under construction will be 47 ft. Thus the water depths at present are at least 6 ft short of requirements.

More Esso Research Facilities

Esso Petroleum Co.'s research center at Abingdon, Berks., where over 400 staff are employed, is being expanded by the building of a new laboratory block and a 3-story office block on an 8-acre site adjacent to the existing laboratories. The former will have a floor area of 10,000 square ft and will house increased petroleum chemical and polymer application research.

Chemical & Petroleum Exhibition

Space for exhibitors at the Chemical and Petroleum Engineering Exhibition, to be held next year from June 20 to 30, is already heavily booked even though the whole of Olympia, London, has been taken for the first time. This was stated by J. M. Storey, CBE, of Sunrod Ltd. and chairman of the Council of British Manufacturers of Petroleum Equipment, speaking at its recent very successful annual dinner in London. Mr. Storey advised any firms interested to make up their minds without delay or they might find themselves too late.

This exhibition is organized jointly by the CBMPE and the British Chemical Plant Manufacturers Association, and at the same time the Federation of European Petroleum Equipment Manufacturers will hold a congress in London. Another important technical gathering at Olympia during the exhibition will be a series of symposia by the Institute of Chemical Engineers and the Society of Chemical Industry as part of the third congress of the European Federation of Chemical Engineering.

Rank's Expansion in Gasoline Retailing

A further development in the plans of the Rank Organization Ltd. for gasoline retailing is announced. It has been awarded a contract by the Ministry of Transport to develop and operate the 12-acre service area on the new Birmingham-Preston motorway. There will be 48 pumps installed, 24 on each carriageway, and these will dispense Cleveland, Esso, Fina and Mobil motor fuels. This is the same number as will be installed under a similar contract announced in August for the new Medway motorway.

Coal vs Oil—Need it Be War?

Must competition between the UK coal and oil industries mean war? Is there any point in one achieving success at the expense of the other?

These were questions which Lord Robens, chairman of the National Coal Board, discussed briefly in a recent address to the Oil Industries Club in London.

Total UK energy consumption last year was 264 million tons, he said. Of this, excluding oil products used for motor transport, and non-fuel uses, the coal industry supplied 80% and oil 16%. The oil industry is expanding and will continue to do so, but coal is relatively stable and for a number of reasons it cannot quickly adjust its production up or down. Looking forward into the "later 1960's," it was generally agreed the nation would require some 300 million tons of coal equivalent. Of this, 290 million would have to be shared between coal and oil. He envisaged coal's contribution to be 200 million tons and, allowing for a margin of coal exports, oil's contribution to be 90 to 95 million tons of coal equivalent.

"In other words, I envisage the burden of economic growth as having to be carried by the oil industry and not by coal.

"Competition is to be welcomed. It has stimulated greater efficiencies in both industries: it is good for both—and the nation as a whole."

But it was not in the national interest to inflict damage on each other, he went on. "If both the coal and oil industries are aware, first, that an expanding energy market will keep them both fully occupied and, second, that coal output cannot be quickly adjusted upwards or downwards, then there is no reason why competition should degenerate into war.

"A war between two such basic industries would not be to the advantage of either. It could not fail to attract the attention of the government.

"Perhaps the heart of the problem lies in the fact that while the coal industry is rather inflexible, the oil industry is too flexible. If competition is to serve a useful purpose, it must be tempered by the understanding that we are together responsible for the nation's resources of fuel and power."

Computers for the Oil Industry

British Petroleum is giving generous support to the University of London towards the provision of a large new computer—the Ferranti Atlas, designed as a general purpose machine for both scientific calculations and data processing, and claimed to be the most powerful in the world. It will be nearly 100 times faster than the Ferranti Mercury Mark II computer which the university's computer unit has been operating since 1959. The new machine will be installed towards the end of 1963 and BP will provide about a quarter of the cost, put at £2 million. In return the company will have an agreed amount of time on the Atlas for 5 years and it plans to use it for a full-scale integration of its refining and supply program.

Another development in this field is the purchase by Shell-Mex and B. P. of a Leo III computer from Leo Computers Ltd., subsidiary of J. Lyons & Co. The latter has been using an earlier Leo model for a number of years for a variety of purposes, including working out supply programs for its network of tea-shops.

Improved Method of Wear Measurement

A variation of the technique of measuring engine wear by radioactive tracers developed by the National Engineering Laboratory at East Kilbride, Glasgow, is described in its annual report for 1960 (H. M. Stationery Office, price 5s). Work on cylinder liner wear in a single-cylinder diesel engine has shown that an amount of the order of 0.5 microinch can be measured.

The disadvantages often found in past techniques of this nature due to the large amount of activity to be handled are eliminated as only a small plug, inserted into the cast iron liner, is irradiated. This plug is made of cast iron containing 0.03% of iridium. Oil samples are taken at intervals and centrifuged, and the activity of the residue is measured by a gamma-ray spectrometer which gives a measure of the wear occurring at the point where the plug is placed.

This method is described in detail in NEL Report LDR 26/60, a copy of which is available on request from the Laboratory.

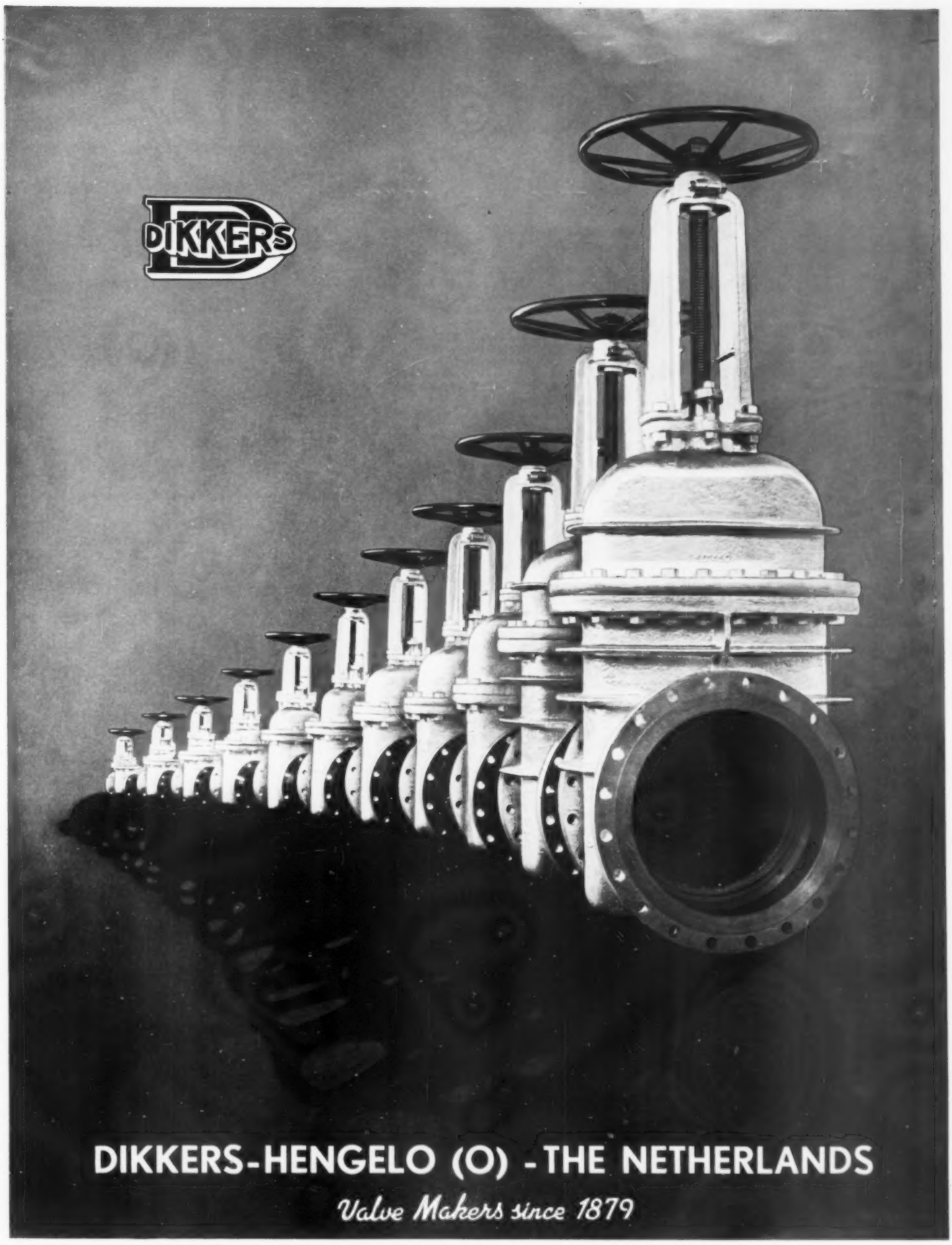
Expanding Shell-BP's Jarrow Terminal

A £600,000 contract has been placed with Robert McAlpine & Sons by Shell-Mex and B. P. for the first stage in a quay improvement scheme at its Jarrow terminal. This will be in two stages and, when completed, will provide a jetty capable of berthing tankers up to 28,000 dwt.

New Publications

"Ministry of Power Statistical Digest 1960"—Is a highly detailed 172-page publication whose 136 tables

(*Continued on page* 10)



IN CANADA: G. DIKKERS OF CANADA LIMITED, SCARBOROUGH, ONTARIO

(Continued from page 8)

present the statistics for 1960 in comparison with earlier years for all aspects of UK energy demand and use. A special section of 31 tables is devoted to petroleum, though numerous references to oil utilization are to be found in the other fuel sections. Published by H. M. Stationery Office, price £1 7s 6d.

"Select Committee on Nationalized Industries: Gas Industry Evidence"—A massive tome of particular interest to the oil industry in that it contains in verbatim form the evidence and cross-examination of the opposing views presented to this parliamentary committee by the Gas Council and the National Coal Board in regard to future town gas manufacture—by large scale importation of liquefied methane or by Lurgi coal gasification plant. It gives, in fact, the background to the report and conclusions of this committee, already published and summarized in WORLD PETROLEUM, October, 1961. Published by H. M. Stationery Office, price £1 10s.

Appointments

R. A. PITTMAN has assumed duties as deputy director of the Council of British Manufacturers of Petroleum Equipment, a new position deemed necessary because of its increasing membership. Mr. Pittman joins CBMPE after 14 years service with the British Engineers' Association, as its secretary since 1956 and previously economic adviser to its research department. In 1956 he was also secretary to an OEEC-sponsored mission to study the work of consulting engineers in the US. The following have recently accepted invitations to serve as co-opted members of the council's executive committee: **O. F. REICHWALD**, OBE (managing director, Daniel Adamson & Co.); **W. H. G. ROACH**, MBE (managing director, Wm. Press & Son); and **H. G. STURGESS**, OBE (managing director, Head Wrightson Teesdale Ltd.).

HUGH C. TETT, chairman and managing director of Esso Petroleum, has been appointed a member of the Council for Scientific and Industrial Research.

E. E. BULLEN, finance director of Shell Chemical Co., has retired and is succeeded by **W. F. TUSON**. The latter is now known as director (finance and economics) and the company's economics and planning department, under A. J. Gait, reports to him.

R. B. W. BOLLAND, formerly general manager of Head Wrightson Stockton Ltd., has been appointed London manager of Head Wrightson & Co. Ltd.

L. Colkett

K. C. McCarthy

L. COLKETT, secretary of Castrol Ltd., **K. C. McCARTHY**, who becomes general manager of the Castrol division on January 1, and **GEORGE THORNLEY**, group technical manager since 1951, have ben made directors of the company.

H. W. Randell

G. H. Thornley

H. W. RANDELL has taken over as London office manager of The Oil Well Engineering Co. in charge of oilfied equipment sales. He has been in the company's service for 28 years and succeeds **H. E. WILKINSON**, who has retired.

W. H. McCoy

S. W. McCune

SAMUEL W. McCUNE III, deputy managing director of Du Pont Co. (United Kingdom), has been promoted to managing director. He succeeds **WM. H. McCOY**, who has returned to the US on special assignment with the parent company. Mr. McCune has been with the company since 1940 and in the UK since 1957, first as general sales manager. Mr. McCoy was project manager for the neoprene plant built in Northern Ireland and now being expanded to make "Hylene" organic isocyanites for use in producing urethane foam.

SIR HAROLD SNOW, CBE, deputy chairman and a managing director of British Petroleum, retires at the end of the year but will remain on the board.

US Equipment Links

Vokes Ltd., filtration specialists of Guildford (Surrey), announces the conclusion of an exclusive license agreement with Chain Belt Co., of Milwaukee, to manufacture the complete range of "Rex" process equipment in Great Britain and certain European territories. This includes mechanically cleaned bar screens, grit collectors and washers, sludge collectors and skimming pipes. The American company has long been outstanding in "tank hydraulics" and the "Rex" travelling water screen is used in some of the largest installations in the world.

Schlumberger Ltd. has acquired Firth Cleveland's 56.7% holding of the ordinary capital of the Solatron Electronic group. The cash price for this controlling interest is £1,927,940. The parent Schlumberger company has recently agreed to merge with Daystrom Inc., a large US manufacturer of electronic equipment.

Vickers-Armstrongs (Engineers) Ltd. announces cross licensing and selling agreements with Racine Hydraulics & Machinery, Inc., of Racine, Wis. Vickers will make Racine hydraulic equipment and distribute it throughout the Commonwealth and to European countries, thus complementing its own "VSG" range. The link will also open up major new markets for Racine in the US for the wide range of Vickers' larger machines as well as chemical process equipment.

Laid-Up World Tanker Tonnage Down

In recent months there has been an appreciable decline in the world tanker tonnage laid up for lack of employment. This is brought out by the following figures issued by the Chamber of Shipping of the United Kingdom, compiled from information received at Lloyd's:

	British	USA	World
	(In 1,000 tons gross)		
September	220	219	1,968
August	219	231	2,109
July	368	304	2,533

Figures relate to the beginning of the month, and exclude coasters and certain vessels normally engaged on short voyages.

Earnings Rise 7.7% through Third Quarter

Oil industry earnings continued to show gains for the first nine months of 1961, although considerably more moderate than those for the first half of the year.

On the basis of returns from 47 companies, tabulated below, earnings rose 7.7% over the same period in 1960; from $2,307,519 to $2,485,079. The growth was better than for 1960 over 1959, when the increase for essentially the same group of companies was a modest 4.6%.

The year thus far has been clouded by drops in net income for some companies and brightened by good rises for others. Healthy increases were recorded by: Creole, 20%; Sun, 19.7%; Socony, 19%; Jersey Standard, 14%; Union of California, 15%; Texaco, 10%; and Cities Service, 16%, among others.

OIL COMPANY EARNINGS—NINE MONTHS
(Totals in $1,000's. Per share is on common)

	1961		1960	
	nine months	per share	nine months	per share
Apco Oil	2,494	4.95	1,999	3.97
Ashland Oil & Refg.*	15,251	2.12	14,927	2.12
Atlantic Refining	31,699	3.38	27,405	2.92
Aztec Oil and Gas	3,881	1.34	3,444	1.19
Barber Oil	(1,055)	—	(628)	—
Belco Petroleum	2,897	0.53	2,180	0.41
Cities Service	30,752	2.87	26,538	2.47
Clark Oil & Refg.	—	—	—	—
Colorado Oil & Gas	3,146	0.88	638	0.08
Commonwealth Oil	8,280	0.71	3,667	0.32
Continental Oil	42,713	1.99	46,348	2.16
Creole Petroleum	181,900	2.34	153,590	1.98
Delhi-Taylor Oil	3,390	0.56	3,050	0.59
Getty Oil	9,011	0.56	6,382	0.40
Gulf Oil	248,935	2.36	237,910	2.26
Imperial Oil	48,007	1.52	46,756	1.48
International Petroleum	22,700	1.56	22,800	1.56
Kern County Land	12,472	2.88	11,172	2.59
Kerr-McGee	2,515	0.40	4,844	0.82
Midwest Oil	6,538	2.66	4,899	1.98
Ohio Oil	27,609	1.94	27,410	1.98
Olin Oil & Gas	3,018	1.04	2,604	0.89
Phillips Petroleum	80,427	2.34	78,920	2.30
Plymouth Oil	(38)	—	(299)	—
Pure Oil	17,357	1.72	20,213	2.04
Quaker State	1,018	1.23	1,361	1.65
Richfield Oil	16,662	2.06	20,776	2.57
Royalite Oil	1,400	0.42	780	0.21
Shell Oil	103,014	1.70	104,308	1.72
Signal Oil & Gas	8,867	0.90	11,960	1.21
Sinclair Oil	26,550	1.75	34,504	2.24
Sinclair Venezuelan	8,592	2.14	10,122	2.53
Skelly Oil	17,071	3.08	17,122	3.02
Socony Mobil	161,600	3.33	135,900	2.80
Standard of Calif.	205,207	3.25	199,255	3.15
Standard of Indiana	112,025	3.13	102,826	2.87
Standard of Ohio	17,961	3.59	17,574	3.51
Standard of N. J.	570,000	2.63	501,000	2.31
Sun Oil	38,220	2.93	34,852	2.83
Sunray Mid-Continent	30,132	1.54	29,079	1.48
Texaco Canada Ltd.	7,433	2.26	8,567	2.61
Texaco	309,239	2.50	278,984	2.30
Texas Gulf Producing	4,050	1.00	3,417	0.85
Texas Pacific Coal & Oil	4,926	1.26	5,759	1.48
Tidewater Oil	21,930	1.40	31,351	2.01
Union Oil of Calif.	27,348	3.13	23,721	2.72
Universal Consolidated	2,617	2.76	1,880	1.98
Wilcox Oil	569	1.72	579	1.80
Totals	$2,485,079		$2,307,519	

NOTE: Figures in parentheses are net losses.
* For year ending Sept. 30. Excluded from totals.

Frederic R. Harris Inc.

Consulting Engineers

144 East 44th Street
New York 17, N. Y.

Engineering for the Petroleum Industry

Construction Management
Studies, Design, Operation

Frederic R. Harris (Holland) N.V.

5 Korte Vijverberg
The Hague, Netherlands

Low-cost way to sweeten gasolines

In many refinery stocks, you can convert mercaptans to less odorous sulfur compounds with Du Pont Antioxidant No. 22.

This type of treating produces a doctor-sweet gasoline, and may save money for you in several ways.

You may save equipment costs, since AO-22 sweetening requires little more than a modification of existing equipment.

You may save on additional chemicals and on regeneration expenses—and you don't lose any gasoline or octane numbers in the process.

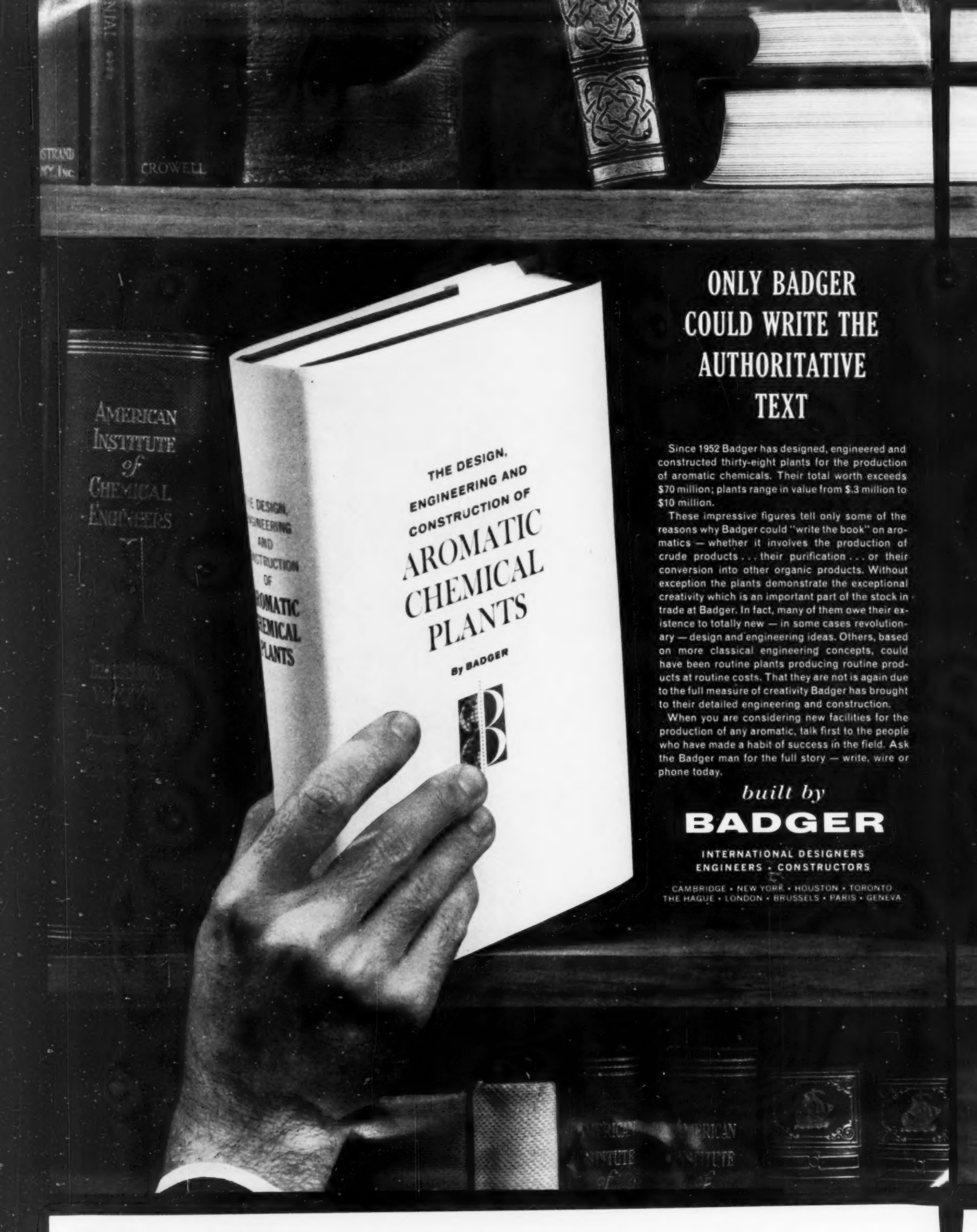
You also eliminate the chance of contamination by sulfur or copper, because sweetening with AO-22 does not require their use.

Stabilizing, too. And, finally, you combine sweetening *and* stabilizing at one time. Du Pont AO-22 retards gum formation and protects the quality of your gasoline in storage. You can add these advantages to your processing wherever your refinery is located, because AO-22 is distributed worldwide by Du Pont.

FOR FURTHER FACTS, we suggest you contact your Du Pont representative or write to: E. I. du Pont de Nemours & Co. (Inc.), Petroleum Chemicals Division, Wilmington 98, Del.

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living . . . *through Chemistry*

Lead Antiknock Compounds
and other PETROLEUM ADDITIVES


THE DESIGN, ENGINEERING AND CONSTRUCTION OF
AROMATIC CHEMICAL PLANTS
By BADGER
AMERICAN INSTITUTE of CHEMICAL ENGINEERS

ONLY BADGER COULD WRITE THE AUTHORITATIVE TEXT

Since 1952 Badger has designed, engineered and constructed thirty-eight plants for the production of aromatic chemicals. Their total worth exceeds $70 million; plants range in value from $.3 million to $10 million.

These impressive figures tell only some of the reasons why Badger could "write the book" on aromatics — whether it involves the production of crude products . . . their purification . . . or their conversion into other organic products. Without exception the plants demonstrate the exceptional creativity which is an important part of the stock in trade at Badger. In fact, many of them owe their existence to totally new — in some cases revolutionary — design and engineering ideas. Others, based on more classical engineering concepts, could have been routine plants producing routine products at routine costs. That they are not is again due to the full measure of creativity Badger has brought to their detailed engineering and construction.

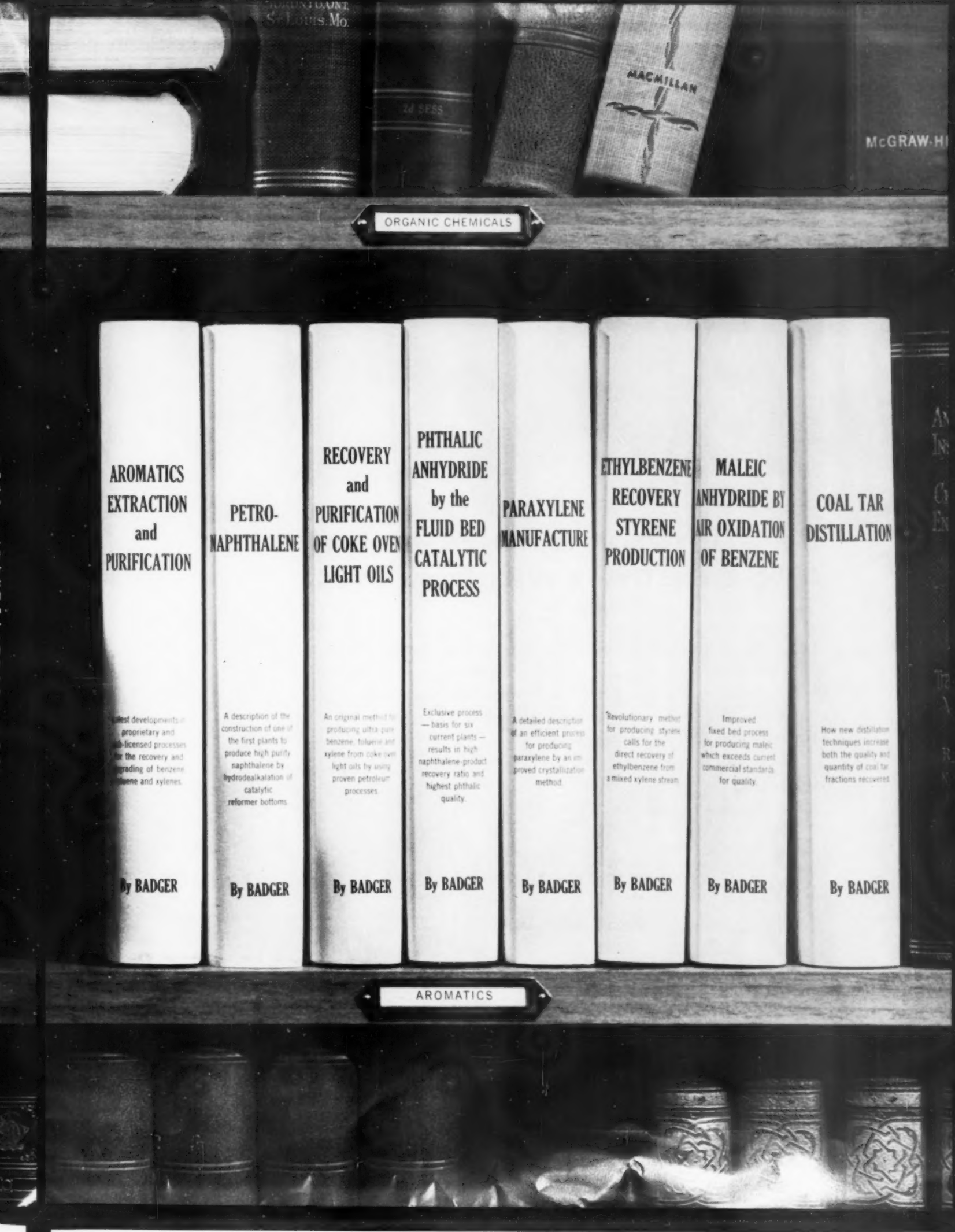
When you are considering new facilities for the production of any aromatic, talk first to the people who have made a habit of success in the field. Ask the Badger man for the full story — write, wire or phone today.

built by

BADGER

INTERNATIONAL DESIGNERS
ENGINEERS · CONSTRUCTORS

CAMBRIDGE · NEW YORK · HOUSTON · TORONTO
THE HAGUE · LONDON · BRUSSELS · PARIS · GENEVA


MACMILLAN
McGRAW-H
ORGANIC CHEMICALS
AROMATICS EXTRACTION and PURIFICATION
latest developments in proprietary and sub-licensed processes for the recovery and upgrading of benzene toluene and xylenes.
By BADGER
PETRO-NAPHTHALENE
A description of the construction of one of the first plants to produce high purity naphthalene by hydrodealkalation of catalytic reformer bottoms.
By BADGER
RECOVERY and PURIFICATION OF COKE OVEN LIGHT OILS
An original method for producing ultra pure benzene, toluene and xylene from coke oven light oils by using proven petroleum processes.
By BADGER
PHTHALIC ANHYDRIDE by the FLUID BED CATALYTIC PROCESS
Exclusive process — basis for six current plants — results in high naphthalene-product recovery ratio and highest phthalic quality.
By BADGER
PARAXYLENE MANUFACTURE
A detailed description of an efficient process for producing paraxylene by an improved crystallization method.
By BADGER
ETHYLBENZENE RECOVERY STYRENE PRODUCTION
Revolutionary method for producing styrene calls for the direct recovery of ethylbenzene from a mixed xylene stream.
By BADGER
MALEIC ANHYDRIDE BY AIR OXIDATION OF BENZENE
Improved fixed bed process for producing maleic which exceeds current commercial standards for quality.
By BADGER
COAL TAR DISTILLATION
How new distillation techniques increase both the quality and quantity of coal tar fractions recovered.
By BADGER
AROMATICS

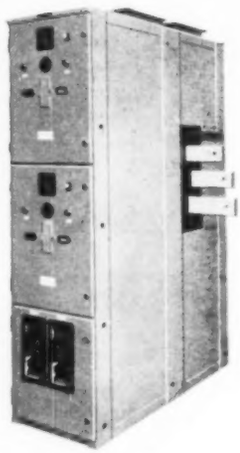
'M'

Class

newest in medium-voltage AIR-BREAK switchgear . . .

The 'ENGLISH ELECTRIC' Class 'M' medium voltage circuit-breaker embodies the latest ideas in design and construction. It incorporates, for example, safety factors hitherto only associated with high voltage circuits. Easy to install, simple to operate and maintain, these circuit-breakers are totally enclosed under all service conditions and isolation is completed behind a closed door. The new range of time-controlled, direct-acting overcurrent tripping units give better performance and discrimination.

Send for Publication SG/352A to:
The ENGLISH ELECTRIC Company Limited, Switchgear Department, East Lancashire Road, Liverpool, 10.



'ENGLISH ELECTRIC'

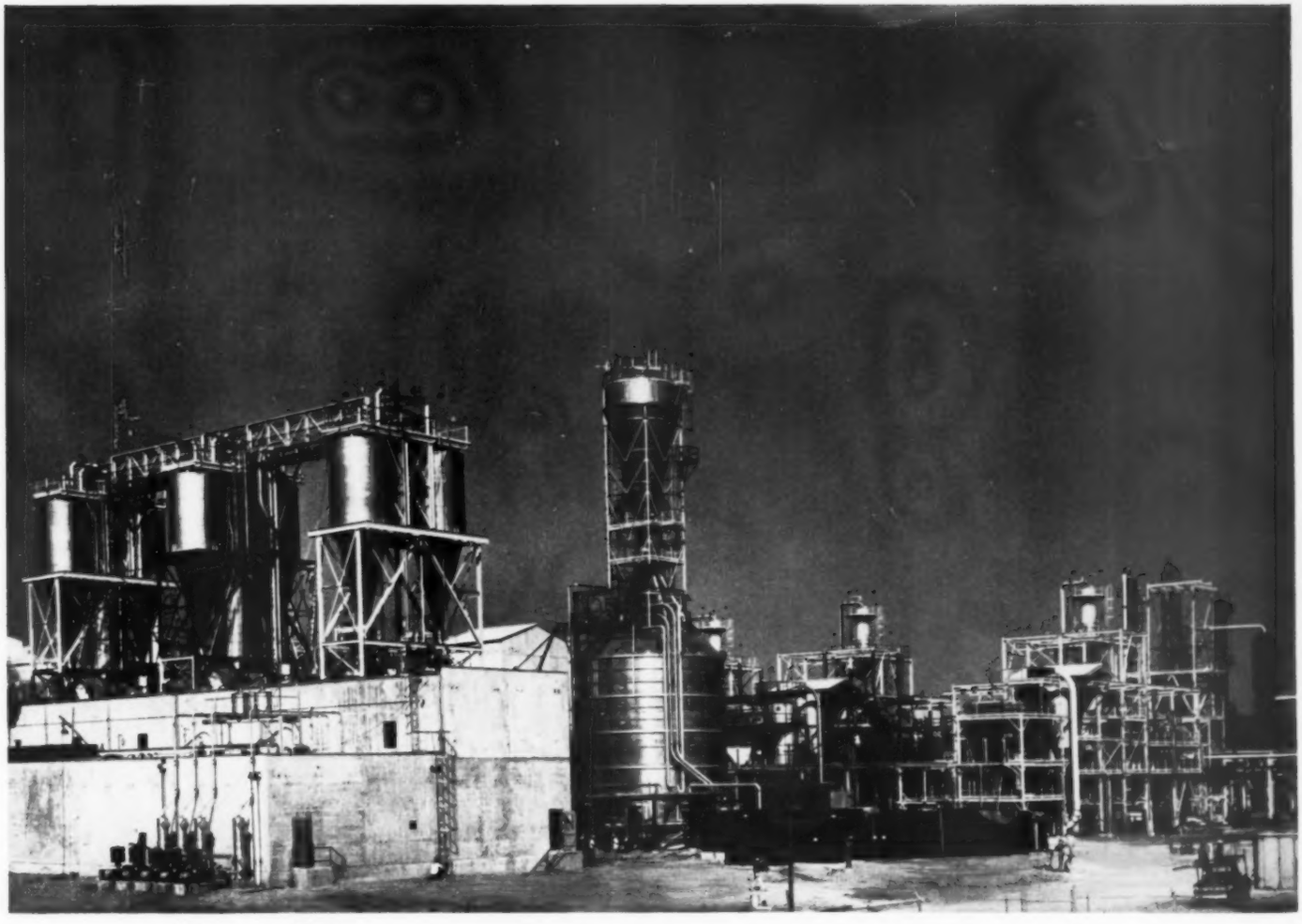
switchgear

31 MVA at 415 volts. ASTA Certificate No. 3789. Compact cubicles of uniform height for 800 and 1,600 amp breakers, 1,600 amp on 2' 0" centres. Unitised busbars for ease of uprating and extension; up to 3,000 amps available. Automatically operated shutters screen cable and busbar connections when the breaker is withdrawn.

THE ENGLISH ELECTRIC COMPANY LIMITED, ENGLISH ELECTRIC HOUSE, STRAND, LONDON, W.C.2

Offices and representatives throughout the world

SGL.43A



AviSun CREATES A NEW SOURCE OF POLYPROPYLENE

AviSun Corporation's recently completed plant, now operating near Wilmington, Delaware, provides a major addition to the nation's polypropylene production.

The plant adds 100 million pounds per year to AviSun's capacity to produce this light, strong and versatile plastic—further stimulating acceptance and use by making it available in more abundant supply.

Bechtel worked with AviSun—jointly owned affiliate of American Viscose Corporation and Sun Oil Company—throughout every phase of the multimillion-dollar project, completing it ahead of schedule. Engineering was performed by AviSun and Bechtel, and Bechtel had sole responsibility for procurement and construction.

BECHTEL CORPORATION

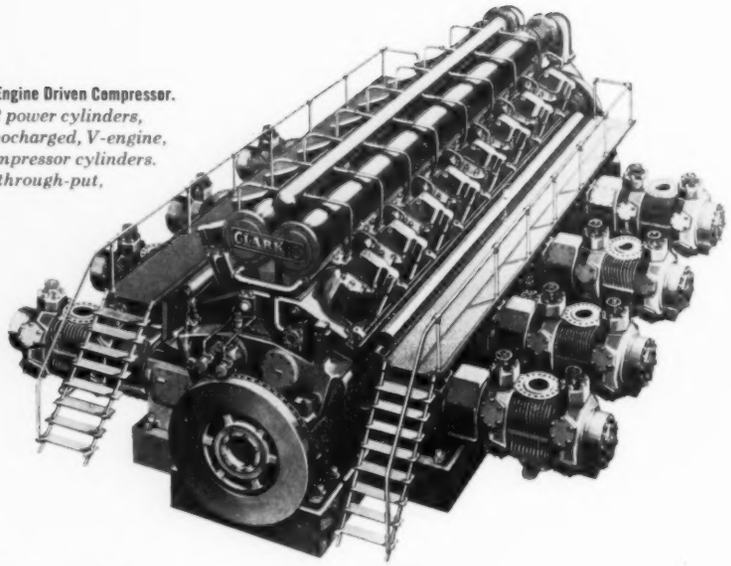
Engineers and Builders for Industry

SAN FRANCISCO • Los Angeles • New York • Houston

Canadian Bechtel Limited

TORONTO • Montreal • Calgary • Vancouver

BECHTEL



Clark Model TCV 2-Cycle Gas-Engine Driven Compressor. *Available with 16 and 12 power cylinders, 5500 and 4000 bhp. Turbocharged, V-engine, horizontally opposed compressor cylinders. Designed for maximum through-put, minimum plant.*

Liquefaction...for Overseas Delivery of Methane Fuels

"Packaging" of methane-rich natural gases in liquid form for easy delivery has been a major industrial goal for some 47 years.

Now the last technological stumbling blocks are being overcome. Soon regular tanker deliveries of these high-energy, low-cost fuels to England will start, based on the success of seven experimental voyages. Deliveries to France and Japan are expected to follow rapidly. The next step, to tank-car and tank-truck transport, is a short one.

World-Wide Significance

This development puts ample supplies of high energy fuel within easy economic reach of *any* country. It goes a long way, too, toward making the fuel-consuming markets independent of any particular fuel-producing country or region.

Areas presently supplied with natural gas by pipeline also stand to benefit. Now that the gas can be liquefied and safely stored at low cost, peak demand can be met with supplies built up during off-peak periods. Both pipeline operators and consumers save.

Liquefaction economics call for versatile and big compressors

It would take well over 600 tankers to carry in gaseous form the methane which *one* tanker carries in liquid form. This fact pictorializes the enormous volumes of methane that must be compressed and fed into a liquefaction system. Then the temperature of this gas must be shoved down into the −300°F region. To do this, enormous additional volumes of both refrigerant and fuel gases must also be compressed.

In one plant, now being designed, nearly 50,000 compressor horsepower is required. What's more, each compressor must be capable of handling any of five duties... methane, ethane, propane, feed natural gas, and fuel gas.

Only Clark can fulfill both requirements with as few as nine machines

Nine Clark 5500 bhp TCV-16's can provide the needed bhp with 7+% to spare. These 2-cycle gas-engine-driven compressors also provide a total availability of 72 compression cylinders. Hence the plant designer has full freedom to arrange for 1/3, 2/3 or 3/3 capacity operation with all duties twice duplicated for maximum reliability.

Note, too, that these huge blocks of Clark bhp occupy smaller space per hp than any other comparable machine

Fewer compressors and smaller space per machine cut *every* installation cost; total machine cost, total foundation cost, total shelter cost, total control cost, over-all maintenance cost, many more. Savings up to 40% and more can be realized along with improved performance and reliability.

Expert engineering assistance anywhere in the world

If you are considering gas liquefaction for liquid methane shipments, for missile fuel supplies, for other purposes, call on Clark for help with the compression engineering. No compressor manufacturer has more experience with liquefaction engineering than Clark Bros. Co., one of the Dresser Industries.

For such help or for comprehensive catalogs on any Clark centrifugal and reciprocating compressors and gas turbines, contact the nearest Clark office.

CLARK
COMPRESSORS
ENGINES · GAS TURBINES

DRESSER INDUSTRIES INC.
OIL · GAS · CHEMICAL
ELECTRONIC · INDUSTRIAL

CLARK BROS. CO. OVERSEAS DIVISION
122 East 42nd Street, New York 17, N. Y.
CLARK BROS. CO. DIVISION, Dresser (Great Britain) Ltd.
197 Knightsbridge, London S. W. 7, England
CLARK BROS. CO. DIVISION, Dresser (France) S.A.
37, Ave. D'Iena, Paris 16, France

UNICOR Protects

■ PIPELINES AND EQUIPMENT AGAINST CORROSION
■ PRODUCTS AGAINST CONTAMINATION

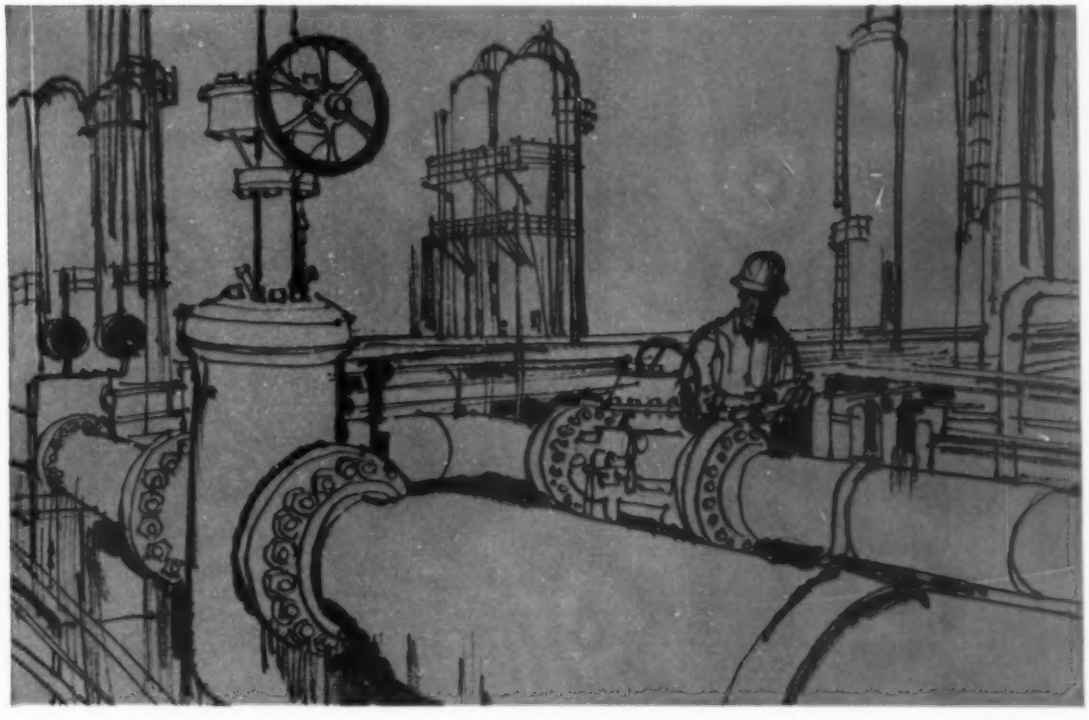
Here's a simple and inexpensive method to protect against corrosion in pipelines, storage tanks and process equipment . . . and eliminate a source of product contamination.

You can add Unicor at any point in your operation. You don't need to add much . . . only 10 to 20 parts in a million parts of petroleum distillates. This potent, oil-soluble additive then plates out a molecular film on the inner surfaces of pipelines, refinery vessels and tanks . . . provides lasting protection against corrosion . . . and safeguards the quality of your products against contamination.

This means important savings through reduced downtime for maintenance and cleaning . . . lower power costs . . . longer equipment life. Its consistent use assures full flow capacity and safeguards product purity.

Our Products Department will be happy to forward detailed information and samples on request. Or, if you wish, one of our field engineers will be happy to show you how Unicor can be best introduced in your operation for maximum effectiveness.

UOP®
UNIVERSAL OIL PRODUCTS COMPANY
30 Algonquin Road
Des Plaines, Illinois, U.S.A.



DISCOVERY ABOUT COMPOSITION

New scientific

SOCONY MOBIL scientists have made a basic discovery about the *composition* of petroleum which also helps solve the mystery of its *origin*.

For the first time, two specific portions of the chlorophyll molecule have been conclusively identified in petroleum. These substances—pristane and phytane—had eluded petroleum researchers for a century. Most scientists doubted that they existed in oil even as mere traces. Socony Mobil scientists have succeeded not only in *identifying* these chlorophyll derivatives, but also in *isolating* them in pure form.

It all began in 1957, when Joe Bendoraitis and Belva Brown were checking some mass spectrum studies of petroleum in a Socony Mobil laboratory. They noticed that the sawtoothed line on the graph had some peaks that stood out like Mount Everests in the otherwise orderly pattern.

It seemed almost futile to the two scientists to try to determine precisely what substance caused the peaks, since petroleum contains perhaps *hundreds of thousands* of different components. Nevertheless they set out to try.

In late 1959 Len Hepner joined them. He was one of the first scientists to use a new instrument, the gas chromatograph, to study the higher boiling ranges of petroleum. With it he could perform in hours work that would have taken months with former methods. He isolated from a sample of petroleum a single drop of the substance that was causing the high peaks.

The three scientists were now beginning to

Research technologist Belva Brown analyzing "mass spec" charts. A University of Texas mathematics graduate, Mrs. Brown worked with the Signal Corps before joining Socony Mobil in 1946. Her leisure activities: oil painting and photography.

Len Hepner, senior research chemist, graduated from the University of Pittsburgh in 1946. His work with the gas chromatograph isolated pristane and phytane from petroleum—and led him to neglect his hobbies of bridge, bowling and tennis.

OF PETROLEUM

knowledge also sheds light on its origin

approach an answer.

Mrs. Brown, with 10 years of "mass spec" experience, kept searching her files of charts for a clue as to what substance showed peaks like that. Finally, she found one with a similar pattern.

This substance was a derivative from shark-liver oil—which contains some pristane. But the biggest source of pristane is chlorophyll, the abundant green constitutent of plants and algae.

What about the peaks Mr. Bendoraitis and Mrs. Brown had detected in the mass spec chart *from petroleum?* Did *they* indicate the presence of pristane?

The three Mobil scientists were positive they did. Their discovery so startled them that they almost doubted it themselves. But they set about proving their findings, step by step. Identifying and isolating pristane had taken four years, since the research had to be sandwiched into their regular assignments. *Proving* they had found it was to take another year.

They now called on new and powerful analytical tools, some of which Socony Mobil was the first oil company to use. They applied nuclear magnetic resonance spectrometry, infrared spectrometry, and hi-mass spectrometry—in unique fashion in many instances. In the process, they discovered a *second* chlorophyll derivative—phytane—and identified and isolated it.

All the tests confirmed their findings. Pristane and phytane are present in perceptible quantities *in petroleum. They can be isolated. And the existence of these two chlorophyll derivatives in petroleum supports the theory that oil was formed through the conversion of material derived from plant and animal life.*

This discovery is so important to fundamental petroleum research that a paper describing it has been recommended by the U.S. Committee for inclusion at the Sixth World Petroleum Congress to be held in Germany in 1963.

Joe Bendoraitis, Belva Brown, and Len Hepner are among the 1,500 men and women engaged in Socony Mobil's $25,000,000-a-year research program—in which imagination is turned into ideas, and ideas into better products and processes.

Probing the far frontiers of science pays off not only for Mobil, but for everyone who does business with Mobil—customers, employees, licensees, and investors.

Senior research chemist Joe Bendoraitis uses nuclear magnetic resonance spectrometer in verifying discovery of chlorophyll derivatives in petroleum. A ham radio operator, photographer, bowler, and stamp collector, he is earning his Ph.D. at night.

Mobil

SOCONY MOBIL OIL COMPANY, INC., 150 E. 42ND ST., NEW YORK 17, N. Y.

18,360 feet in 22 hours...

James F. Lucas running a Failing CFD-1 drill

Tripoli, Libya

Herb J. Hawthorne
Box 7366
Houston 8, Texas

Dear Sirs:

After reading the article about the footage records set and broken in Libya with HJH bits, we feel we should mention the record we have achieved.

On January 18, with four Failing CPD-1 drills, two American and two Libyan drillers, we set our record. Fifty eighteen-hole patterns, twenty feet deep, only to be broken by ourselves the following day with fifty-one patterns, for a total of 18,360 feet, or 918 single 20' holes. Total drilling time was eleven hours per day.

The above record was achieved while using HJH "Blue Demon" Series AC-600 3-blade Insert Rock Bit Blades. We have been well pleased with the service and performance given us by your bits.

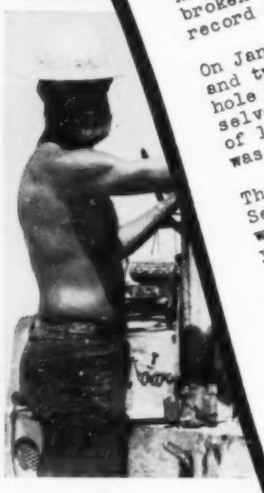
Also at this time, we feel it worth mentioning our record set while drilling in the sand dunes. With one Failing CFD-1 and a sand drill we designed ourselves, we drilled thirty-two eighteen-hole patterns twenty feet deep in 12 hours drilling time.

We feel our record is one to be proud of, and would like to know when and if it has been beaten.

Respectfully yours,

James F. Lucas
Donald R. Hale

Drillers; Esso Seismic Party 1



Donald R. Hale running the custom-designed sand drill.

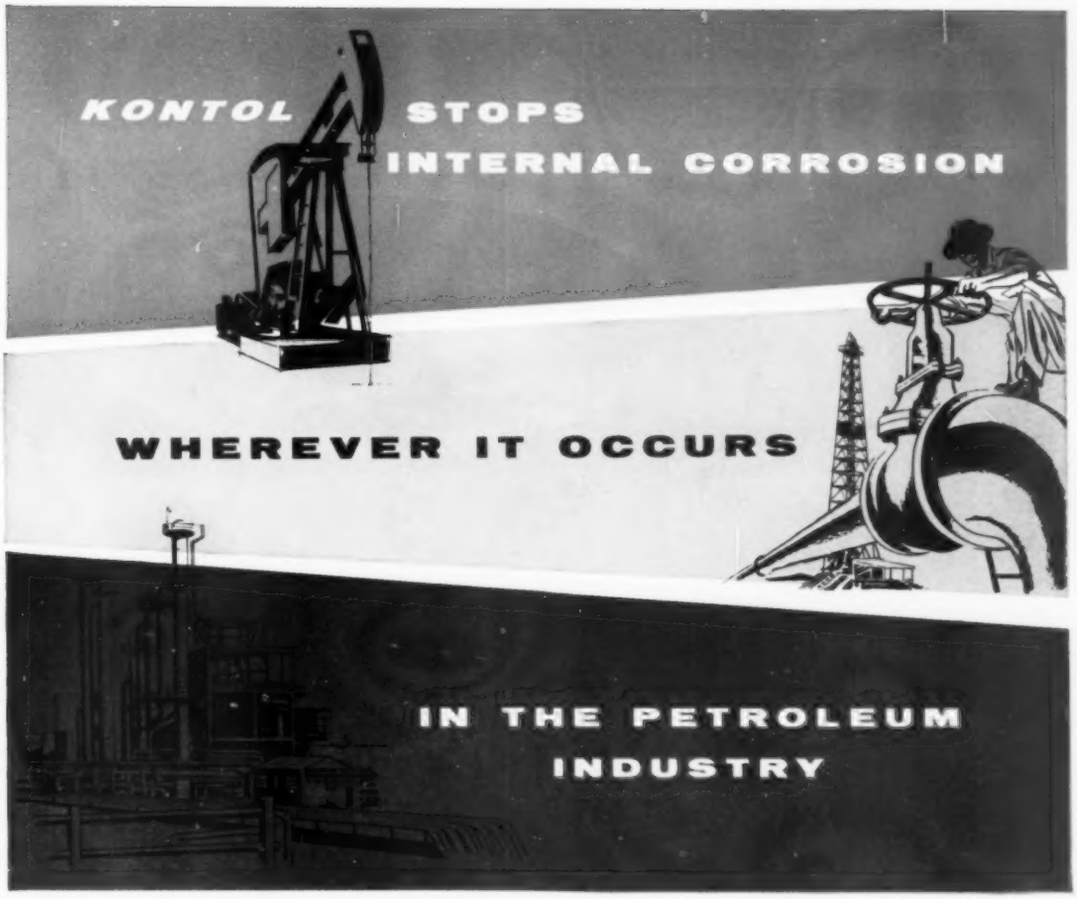
Drilling Crew for Esso Seismic Party 1 operating in Libya.

. . . what more can we say?

HERB J. HAWTHORNE INC.

HAWTHORNE OFFICE AND PLANT

8601 North Main Street, Houston 8, Texas • P. O. Box 7366. Cable Address: HAWBIT



KONTOL* Corrosion Inhibitors are organic chemicals with a remarkable record for preventing internal corrosion in oil fields, refineries, and petroleum transportation systems. KONTOL formulations are semi-polar compounds which adsorb to metal surfaces, forming an impervious film that provides protection against chlorides, sulfides, acids, and other corrosive agents. Oil men throughout the world have found KONTOL corrosion control to be positive, convenient, safe, and economical.

At the well site KONTOL is injected into the well by chemical pump or batch application. Casing interiors, pumps, tubing, sucker rods, and flow lines receive constant protection.

During transportation of crude oil or refined products, KONTOL protects gathering lines, storage tanks, pipe lines, and transportation equipment.

At the refinery KONTOL is injected at various points in the system. It protects vapor and liquid hydrocarbon systems, absorber-stripper gasoline systems, and other refinery equipment. KONTOL also protects against hydrogen blistering and embrittlement.

KONTOL—available in liquid, stick, pellet, and granular form—can be applied in a variety of ways. A Petrolite representative will be glad to help you solve your particular corrosion problems.

Petrolite also offers: TRET-O-LITE* *Chemical Demulsifiers,* TRET-O-LITE* *Desalting Chemicals,* SOLVO* *Paraffin Removers,* FLUDEX* *Water Flood Additives,* TOLAD* *Fuel Additives,* PETRECO* *Electric Desalters,* TRETOLITE *Chemical Desalters, Petreco* ELECTROFINING,* *Precipitators,* BENDER* *Catalytic Sweetening Units, and other specialized petroleum treating equipment and products.*

*Registered trademark, Petrolite Corporation

PC-60-5ER

PETROLITE CORPORATION

SUBSIDIARY AND AFFILIATED COMPANIES
CANADA, Edmonton, Alberta • GERMANY, Frankfurt, a. M.
VENEZUELA, Caracas

PETROLITE LIMITED
20 Savile Row, London W1, England
TRETOLITE COMPANY DIVISION
Saint Louis 19, Missouri • Bree, California
PETRECO DIVISION
Houston 1, Texas

REPRESENTATIVES
ARGENTINA, Buenos Aires • BRAZIL, Rio de Janeiro • COLOMBIA, Bogota
ITALY, Rome • JAPAN, Tokyo • KUWAIT, Kuwait • MEXICO, Mexico, D. F.
NETHERLANDS, The Hague • • TRINIDAD, Port of Spain

BEHIND THE MACHINE

Advanced designs; a wide range of types and sizes; high performance figures; these are the results of over twenty years' experience of design, research and manufacture of gas turbines by AEI engineers.
AEI gas turbines have been installed in aircraft and merchant ships and in frigates and destroyers of the Royal Navy. Industrial machines are suitable for every mechanical drive application as well as power generation, and they have output ratings of 1,750 kW and upwards.

The picture shows work on the rotor of an L21C gas turbine being built for the Basrah Petroleum Co. Larger machines of similar design —the L51C—were recently installed in Iran to supply power for the electrification of the Gach Saran oilfield.

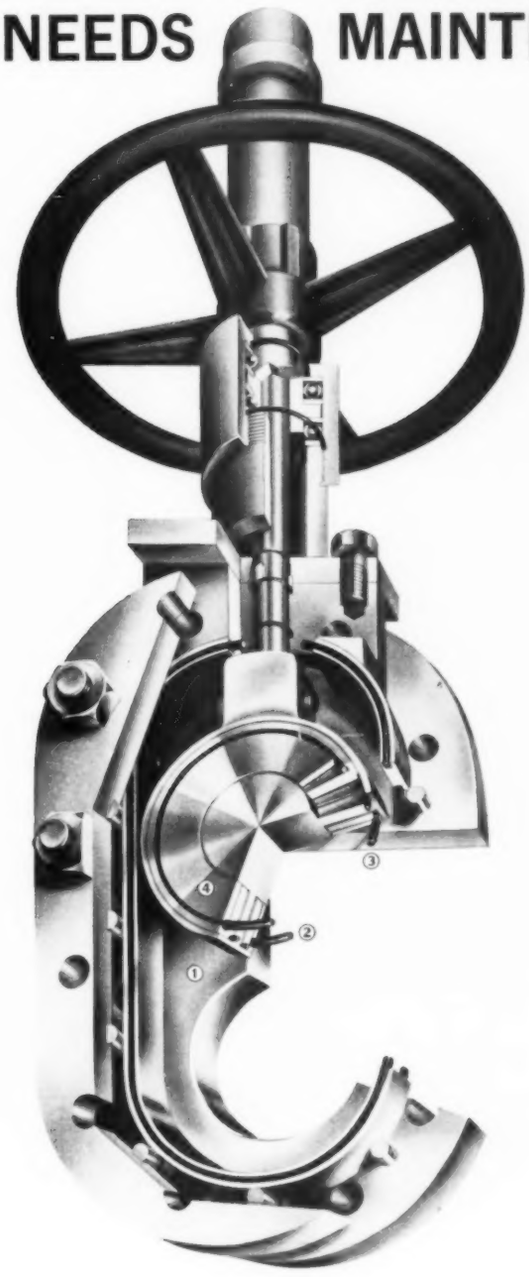
Produced on behalf of AEI Turbine-Generator Division, Britain's largest manufacturer of turbine-generators.

AEI Associated Electrical Industries Export Ltd

33 GROSVENOR PLACE, LONDON SW1

B.L003/1

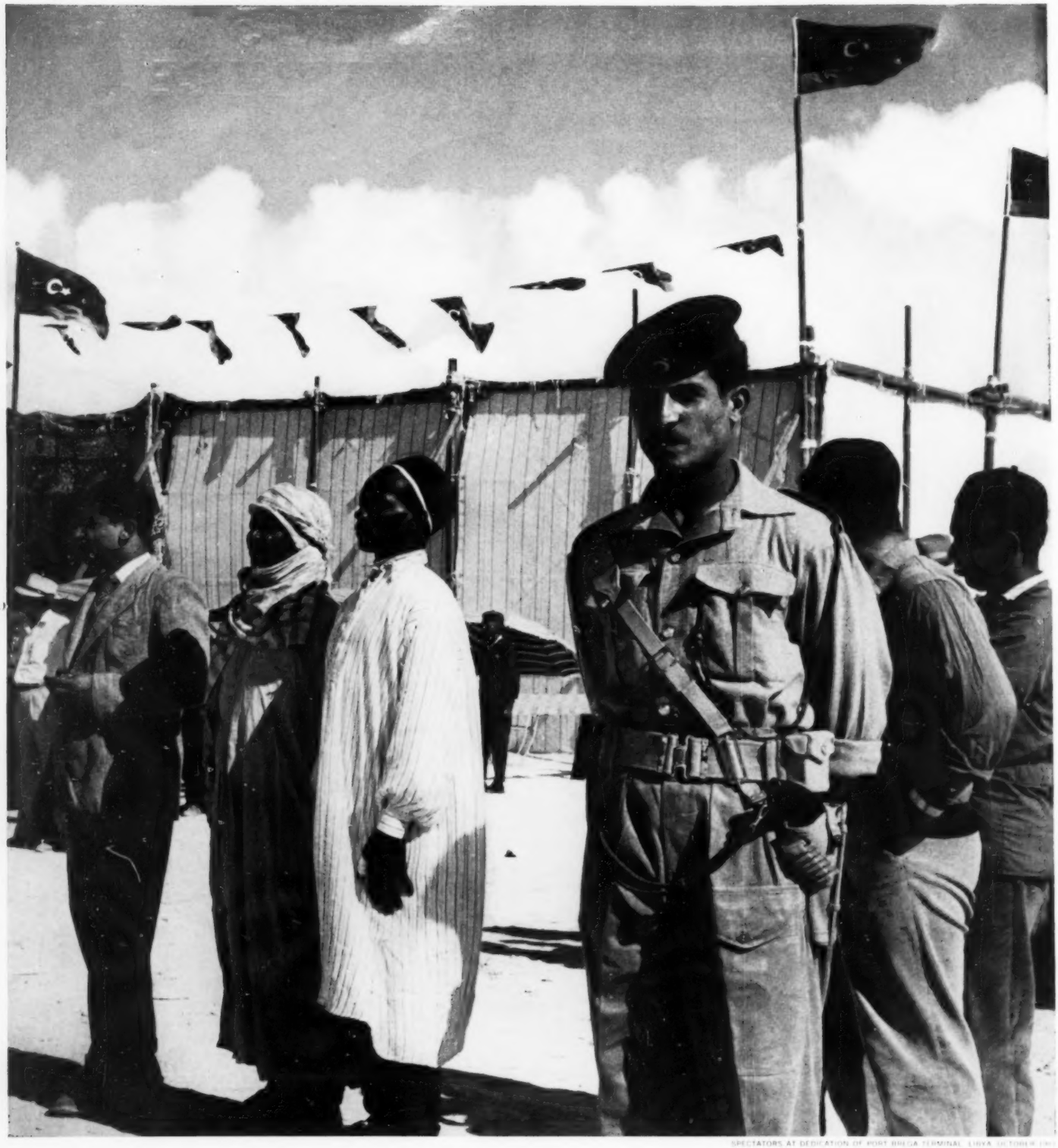
HERE'S WHY A GROVE G-5 NEVER NEEDS MAINTENANCE



The big reason you can hook up a Grove G-5 and forget it is the famed Grove round opening "big valve" design. You get (1) precision ground, chrome plated and polished side plates for positive metal-to-metal seal, backed by (2) proven Grove protected Seal-"O"-Rings® on both sides of the gate, for (3) up and downstream seal. Because the o-rings are on the gate (4), they are out of the flow at all times, protected from damage caused by contaminates in the bore. The big plus feature—Grove G-5 valves never need lubrication. Grove class 150 and 300 G-5 valves are available in lever, handwheel or bevel gear operated models, sizes 2" through 36".

GROVE PIPELINE VALVES

GROVE FRANCE S.A., 24 Rue de Penthievre, Paris 8e
GROVE VALVE AND REGULATOR COMPANY
a subsidiary of Walworth • OAKLAND 8, CALIFORNIA, U.S.A.
Western Continental European Sales Representative (except Italy)
Pétrochimie, 77 Rue la Boétie, Paris 8e
Licencees: Nuovo Pignone, Casella Postale 487, Firenze, Italy
Robert Cort & Son, Ltd., Reading, England



SPECTATORS AT DEDICATION OF PORT BREGA TERMINAL, LIBYA, OCTOBER 1961

"Libyans—at all levels and in all parts of the country—have shown their willingness to join in the work of making their nation a significant oil producer. We in Jersey have been fortunate to be associated with such people in the big job of bringing Libyan oil to world markets."

—M. J. Rathbone, President

ESSO

Standard Oil Company (New Jersey)

(WHOSE PRINCIPAL U.S. OPERATING AFFILIATE IS HUMBLE OIL & REFINING COMPANY)

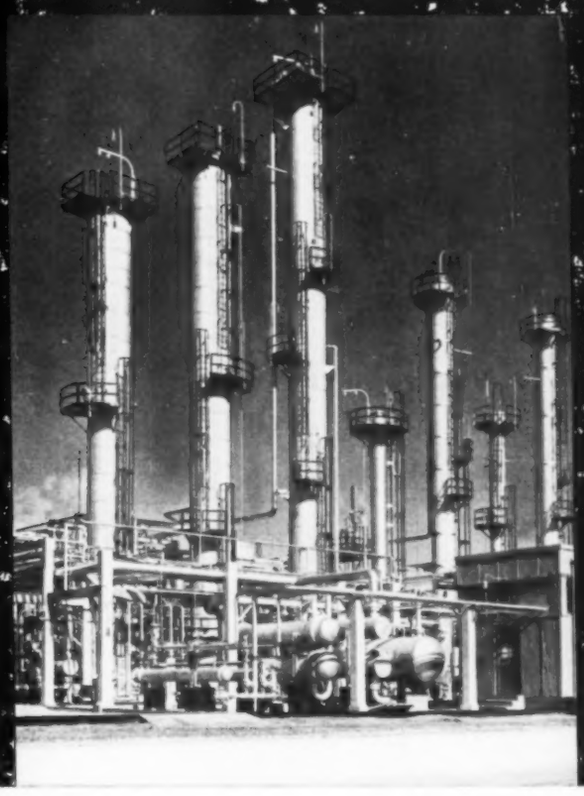
21 Procon-built plants meet benzene demand

The growth of the plastics and synthetic fiber industries has created an increasing world demand for benzene. To help meet this requirement Procon has built or is completing 21 plants . . . in every section of the United States . . . as well as other free world locations such as Germany, Brazil, Canada, The Canary Islands and Australia.

Typical of Procon's petrochemical construction, these benzene plants provide adaptability and versatility through the incorporation of the Udex and/or Hydeal processes. Udex permits the recovery of high-purity benzene and other aromatics from petroleum hydrocarbon mixtures . . . while Hydeal allows production of benzene from toluene and xylenes for greater economic flexibility.

If you require construction in the chemical, petrochemical or petroleum refining industries . . . no matter what the process, the product or the location . . . Procon can do the job . . . complete it on or before the agreed date . . . to your satisfaction.

Why not call us for the full story?



PROCON

PROCON
Incorporated

1111 MT. PROSPECT ROAD
DES PLAINES, ILLINOIS, U.S.A.

PROCON INTERNATIONAL S. A.,
CHICAGO, ILL., U. S. A.
PROCON (CANADA) LIMITED,
TORONTO, CANADA
PROCON (GREAT BRITAIN) LIMITED,
LONDON, ENGLAND
PROCON PTY. LIMITED,
SYDNEY, AUSTRALIA
PROCOFRANCE S.a.R.L.,
PARIS, FRANCE
PROCON LIMITADA,
SAO PAULO, BRAZIL
PACIFIC PROCON LIMITED,
MANILA, P. I.
VICAPROCON, S. A.,
CARACAS, VENEZUELA

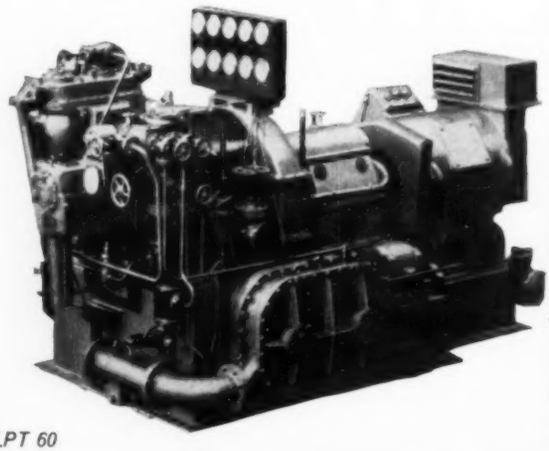
When at sea Electrical power for the M.T. MONTANA . . .

is generated by a Brotherhood 300kW A.C. Self-contained steam Turbo-Alternating Set. A 'Spanner' waste heat boiler using exhaust gases from the main NEW DOXFORD 67 PT6 ENGINE supplies the steam for the set.

Owners:
A/S Tanktransport,
Tonsberg, Norway.

Shipbuilders:
Sir James Laing
& Sons Ltd.,
Sunderland.

Engine-Builders:
Wm. Doxford &
Sons (Engineers)
Ltd., Sunderland.



Please ask for leaflet LPT 60

PETER BROTHERHOOD LTD
PETERBOROUGH ENGLAND

Compressor and power plant specialists for nearly a century

P5796

Move the man off the monkey-board

GUIBERSON

*Type **H** Hydraulic*

WIRE LINE OIL SAVER

Hydraulically operated, Guiberson's Type H Wire Line Oil Saver is controlled remotely by applying or releasing hydraulic pressure through a 50' hose from pump to saver. The Type H effectively and uniformly cleans the wire line. This keeps the working area and equipment free of well fluids, reducing the hazards of fire and accident. Comply with Guiberson's slogan, "Better Be Safe Than Sorry," by using the Type H. There is no need for a man on the monkey-board during swabbing and redressing operations, which should please your insurance company.

Advantages of Type H Saver:

Hydraulically operated by field-proved piston principle . . no trouble-causing rubber bladders or complicated mechanism.

Large rubber and generous bushings give a smooth, constant seal. Rubber can be used until almost completely consumed.

Ram has 2½" hydraulic stroke with spring-actuated return.

Non-sparking, durable split bushings . . top and bottom interchangeable.

Saver is quickly and economically redressed at top of unit . . no threaded connections.

Bushings and rubbers for ⅜" to ⅝" or ¾" to 1" line.

Remotely controlled . . allows at least 50' leeway from saver to pump.

For swabbing, gun perforating and other wire line operations, put the Type H to work. Ask your Guiberson man for a demonstration.

Long-life packing rubber and bushings.
Corrosion-resistant brass body.
Pressure gauge with marked operating ranges also indicates degree of rubber wear.
Redressing tool.
Hand controlled pressure relief valve.
Hydraulic pump with base.
Convertible to any field connection by changing only the base.
Fluid-filled 50-foot hose with check valve each end.

Better be Safe than Sorry — go Guiberson

THE GUIBERSON CORPORATION

DALLAS, TEXAS, U. S. A.

PRODUCTION, DRILLING AND WORKOVER SPECIALTIES, MOLDED RUBBER PRODUCTS

DRESSER INDUSTRIES INC.

OIL • GAS • ELECTRONICS CHEMICAL • INDUSTRIAL

by William C. Uhl
Processing Editor

Highlights of the month—Refinery gasoline output and quality can be substantially increased, commercial results with new hydrocracking process indicates . . . USA petrochemical plant investment expected to continue strong increase through 1960's

A substantial increase in gasoline yield and quality has been reported for the first commercial installation of the new Universal Oil Products Co.'s "Lomax" process, a fixed-bed catalytic hydrocracking technique.

The unit, of 2,200 b/d design capacity, went into operation at Powerine Oil Co., Santa Fe Springs, Calif., in August, and is the largest commercial Lomax unit which has been announced as being in operation to date. Lomax was first described in these columns some 18 months ago (WORLD PETROLEUM, May, 1960, p. 36).

Operating on a diesel oil charge, the Powerine unit is producing approximately 118% yield of gasoline components. This has resulted in an overall increase in refinery gasoline production of about 20% with a 5 octane number increase in refinery pool octane after Platforming the Lomax unit product stream. Another advantage realized has been a low bromine number finished gasoline with a higher sensitivity for better road performance.

The Powerine refinery previously had two Platforming units, and has now installed a third Platformer designed to produce 100 clear octane gasoline from the Lomax unit product. One unique feature is that the first reactor also serves to pretreat thermally cracked naphtha for subsequent processing to the third Platformer.

Operations have virtually duplicated previous pilot plant operations of the Powerine diesel oil charge. Results at Santa Fe Springs, as well as additional new estimates of profitability for Lomax, were reported in a paper by James G. Eckhouse of UOP at the fall meeting of the California Natural Gasoline Association.

The new process is seen attractive to refiners because its flexibility permits not only a wide selection of feedstocks but also a wide choice of product distribution ranging from maximum middle distillate to maximum gasoline. This allows balancing of seasonal demands and the processing of otherwise undesirable feeds. It produces distillates of high quality for use as premium diesel and jet fuels, and (combined with catalytic reforming) produces high quality gasolines containing no olefins.

These factors, combined with low operating costs, mean a good payout. Mr. Eckhouse presented data on the economics of converting No. 2 fuel oil to gasoline through an entirely self-contained combination of units in which there is no interchange back and forth between existing or other refinery facilities.

In this example, 10,000 b/d of No. 2 fuel oil is processed in a Lomax unit. The charge consists of 50% virgin distillate and 50% catalytic cycle oil. With the addition of a hydrogen generator and a Platforming unit, the three units are completely self-contained. Processing to maximum gasoline, the 10,000 b/d of No. 2 fuel oil yields 9,884 b/d of 101-octane 10-lb RVP gasoline plus 1,260 b/d of excess isobutane.

Total process investment for this combination is $7.5 million. This includes $4 million for the Lomax unit, $1.7 million for a 13 mmscf/d hydrogen generator, and $1.8 million for a 7,500 b/d Platformer.

This will payout in 2.7 years, after taxes, and assuming 14¢/gal for 101-octane gasoline product, 9¢ per gal for isobutane, 9¢/gal for No. 2 fuel oil charge, and 36¢/million Btu for fuel gas.

Operating costs were calculated for each unit based on electricity at 0.8¢/KW and using all electrical drives in the various units. Cooling water was priced at 1.5¢/1,000 gals, and fuel at the same price as the above product value of 36¢/million Btu. The operating cost calculations include direct labor at $3.50 per hr, maintenance, catalyst and chemicals, royalties, taxes, and insurance. No allowance has been made for offsite investment; however, the utility prices include amortization of offsites.

In refineries in which hydrogen is available from other facilities, and in cases where existing reforming capacity will satisfy octane requirements, the payout would of course be even better.

New UOP Lomax unit at Powerine Oil Co.'s Santa Fe Springs, Cal., refinery

A still further process scheme with coking was also discussed by Eckhouse. In this, a 22° API California crude oil was processed to ultimate gasoline yield by coking of the atmospheric reduced crude, Lomaxing both the virgin 375 F+ gas oil and the coker gas oil to ultimate gasoline yield, and Platforming of all virgin and cracked naphthas. A 98% yield of gasoline on crude was obtained, together with 6% excess butane and 10.8 wt-% coke.

Investment in the USA in petrochemical plants will continue to rise sharply in the 1960's especially in comparison with conventional refining expenditures, according to Henry G. McGrath and Luther R. Hill of M. W. Kellogg Co. in a paper scheduled for presentation at the annual meeting of the American Petroleum Institute in Chicago in mid-November.

By 1970, capital investment in USA petrochemicals will reach an annual rate of $1.4 billion, while that for refineries will be $0.9 billion, the Kellogg men estimated. These figures represent almost double the estimated 1961 rate for petrochemicals, $0.8 billion, and a 50% increase over the 1961 rate for refining, $0.6 billion.

The rise in output of USA petrochemicals during this coming decade was also estimated by the speakers. Production is expected to more than double, rising from some 60 billion lb in 1960 to 65 billion this year, 100 billion in 1965, and 135 billion in 1970. On the basis of percent of the total of all USA chemicals production, petrochemicals will increase from 32% in 1960 to 41% in 1970.

The growth in dollar value of this production will be even sharper. Last year the value of petrochemicals production was $6.4 billion, or 61% of the total value of all chemical output in the USA. By 1965, it will be $10.5 billion, and by 1970 it will be $15.3 billion, or 64%. This would indicate that more higher priced petrochemicals would be produced in future years. The average for 1960 was 10.67¢/lb, and in 1970 it will be 11.33¢/lb.

There is not going to be any continuing battle between refiners and petrochemical processors. Rather, there will be an overlapping of refining to take over part of petrochemical manufacturing and the continuation of chemical manufacturers to achieve a larger stake in the petrochemical field. The reasons for this are several: (1) cheap raw material, (2) dependable raw material, (3) raw material which is easy to handle, (4) an excellent forecast of future availability, and (5) expected continued low production costs relative to the rest of the economy.

What's New in Processing

Planned—a new 13,500 b/d refinery at Halifax, Nova Scotia, by Texaco, provided satisfactory agreements can be reached with Provincial authorities.

• • •

Under study—a new refinery at Kode, Sweden (near Stenungsrund), by British Petroleum Co., the area at one time studied and then vetoed by Gulf.

• • •

Planned—a new refinery in the United Kingdom, by Texaco, with an expected capacity ranging from 30,000 to 100,000 b/d. Texaco would have a 75% interest in the plant and products would likely be marketed through Regent Oil Co. Ltd.

• • •

Contract awarded—by East African Oil Refineries Ltd. (jointly owned by British Petroleum and Shell), to Procon (Great Britain) Ltd., for the 39,000 b/d refinery scheduled for completion at Monbasa, Kenya, by the end of 1963.

• • •

Planned—a $27 million, 2,700 b/d lube oil plant, in Trinidad, by Texaco, whose chairman, A. C. Long, said that subsequent investment of an additional $27.5 million would make it possible to triple this capacity.

• • •

Completed—a 20,000 b/d crude still at the government refinery at Szony, Hungary.

• • •

Approval expected soon—by Costa Rica's government, for $10 million, 5,000 b/d refinery at Alajuela by Refineria de Costa Rica S.A. (50% Phillips Petroleum and 50% local investors). Site is near Inter-American Highway and El Coco airport. Project already has approval of government's technical industrial commission. Four other proposals, including Texaco's for a refinery at Puerto Limon, have been rejected.

• • •

(*Continued on page 30*)

An Example of the Benefits of Giving CBL the Complete Responsibility

IN DINSLAKEN 87 STEEL TANKS FOR BP RUHR-REFINERY

The advantages of placing complete responsibility for steel tanks and processing equipment with world-experienced Chicago Bridge Limited are demonstrated by the 87 tanks completed at the BP Ruhr-Refinery near Dinslaken, Germany.

19,000 tons of steel (87 tanks) were erected in 16 months, with painting completed 4 months later. CBL was in charge of the entire tankage project, including designs, supervision of fabrication, erection and painting.

The speedy completion of this tankage demonstrates one of the most important advantages of letting CBL handle the job from start to finish. Long experienced in fulfilling major assignments of this type, CBL employs the most modern equipment, including the latest CBL automatic welding machines. Modern testing procedures are likewise followed, using CBL's own X-ray equipment operated by CBL's technicians.

Get in touch with CBL now to learn how you can benefit by using this complete service for your storage requirements. CBL and its subsidiaries are staffed to operate throughout the European area, employing local technical manpower and local labor who work under experienced CBL supervisory personnel.

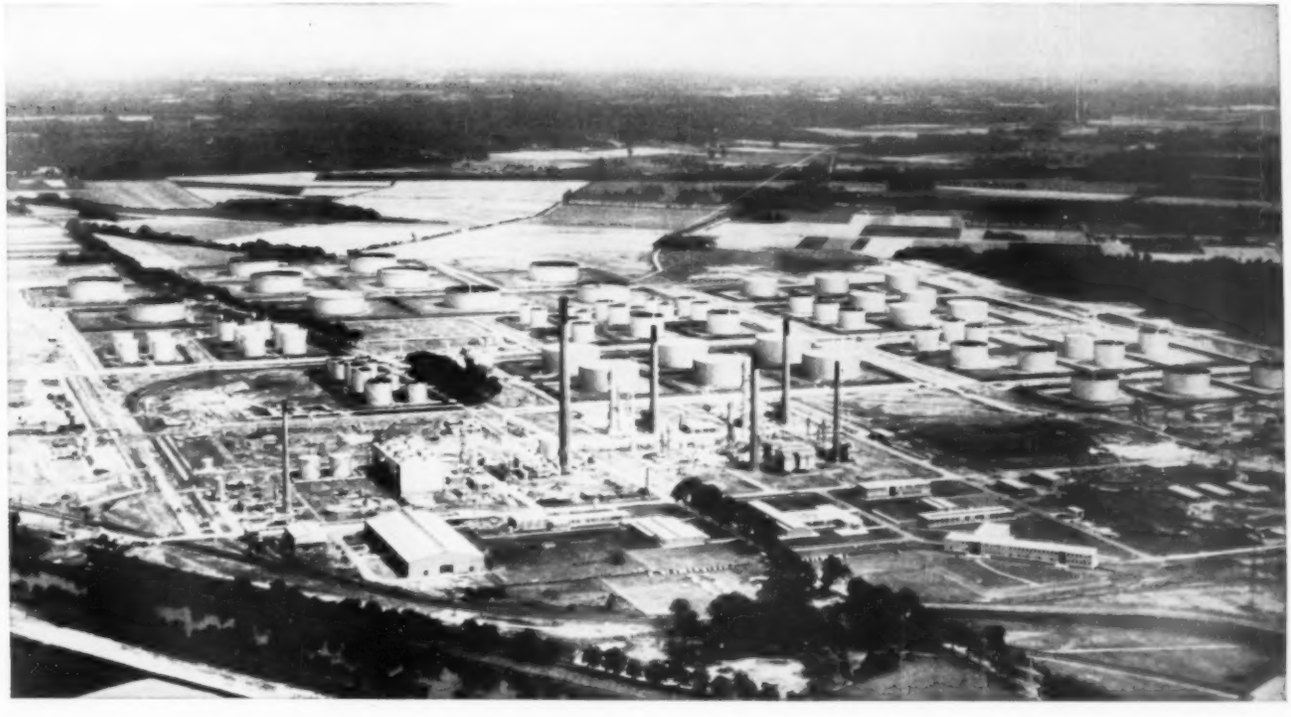
42 Horton Floating Roof tanks, 25 Cone Roof tanks, 4 Hortonspheres, 1 Horton Tripod Elevated Water Storage tank and 1 Liquid Sulphur tank were erected under CBL responsibility in 16 months.

CBL limited

Chicago Bridge Limited
36/37 Piccadilly
London W.1., England
Chicago Bridge (Nederland) N.V.
Rotterdam 22, Holland

CBL1 611

Luftbild: RHEINLAND FLUGDIENST Gmbh. b. H. Düsseldorf-Flughafen, freigeg. d.d. Reg. Präs. Düsseldorf unter der Nr. 04/32



(*Continued from page 28*)

Planned—a 3,500 b/d Ferrofining unit at the lubricants plant of British Petroleum's Llandarcy refinery in Wales, UK, with completion at end-1962. The process was developed by BP Group scientists in France and England.

• • •

Planned—a new refinery on Portugal's Cape Verde Islands, possibly about 15,000 b/d, by Golden Eagle Refining Ltd., who have been awarded rights under which company would have 60% interest, Portugese government 40%. Output would be aimed primarily at the bunker business.

• • •

Site preparation started—for Jamaica's first refinery, a 26,000 b/d facility to be built by Esso Standard Oil S.A.

• • •

Completion near—Maruzen Toyo Oil Co. Ltd. expects to complete its $20 million (Malayan dollars), 20,000 b/d refinery at Pasir Panjang in Singapore by end of this year.

• • •

Under construction—the new $125 million, 100,000 b/d refinery of Standard Oil of Kentucky at Pascagoula, Mississippi.

• • •

Completed—the 7,500 b/sd refinery Holyrood, Newfoundland (near St. Johns) by Golden Eagle Refining Co. Ltd.

• • •

Planned—a new 25,000 b/d refinery at Porto Alegre, Brazil, by Petrobras, with construction to start in 1962. The Belo Horizonte proposal is still under study.

• • •

Contract awarded—to Foster Wheeler Ltd., for design, engineering, and procurement of a new 14,300 b/sd crude still, at Burma Oil Co. (1954) Ltd.'s Syriam (Rangoon), Burma, refinery, for completion in July, 1963.

• • •

Planned—a 9,500 b/d UOP Lomax unit at the 40,000 b/d Mizushima, Japan, refinery completed last summer by Mitsubishi Oil Co. Ltd.

• • •

Refinery site selected—by Standard Oil Co. of California, at Cook Inlet, Alaska, for its proposed $11 million, 20,000 b/d refinery.

• • •

Contract awarded—to Procon, Inc., for construction of a 10,000 b/d UOP Platformer, 2,200 b/d Unifiner and Udex extraction unit, at Detroit, Mich., by Aurora Gasoline Co.

• • •

Capacity increased—The refinery to be built by Esso Sirte, Inc., affiliate of Standard Oil Co. (N.J.) at Port Brega, Libya, will be 8,000 b/d, instead of the 4,000 b/d announced originally. Completion is expected by 1963.

• • •

New construction approved—by Italy's Interministerial Commission of Petroleum, will bring the nation's total refining capacity to about 1.7 million b/d when completed. They include:

(1) ALMA, expansion at Ravenna, to 2,000 b/d.

(2) ANIC, enlargement to 80,000 b/d of the new 40,000 b/d refinery being built at Pavia.

(3) Getty Oil Italiana, expansion of Gaeta refinery to 60,000 b/d.

(4) IPLOM, expansion of its Genoa refinery to 20,000 b/d.

(5) NILO, expansion at Milan to 40,000 b/d.

(6) SARPOM, expansion at Trecate (Milan) to 90,000 b/d; and cancellation of the previously approved Esso Standard Italiana proposal for a 60,000 b/d refinery in the Po Valley.

(7) SIROM, removal of its 1,000 b/d refinery from Monza (near Milan) to Lomello (Pavia) and expansion to 20,000 b/d.

(8) VOLPATO, removal of its refinery from Milan to Talamone, and expansion to 20,000 b/d.

What's New in Petrochemicals

Planned—an 8 million lb/yr polyisobutylene plant at Baglan Bay, South Wales, England, by W. R. Grace & Co.'s Overseas Chemical Division, for completion at end-1962, to be designed and constructed by Parsons Power Gas of London, to operate on a mixed butane-butylene stream from British Hydrocarbon Chemicals Ltd. adjoining plant now being built, and using a process developed and licensed by Cosden Petroleum Corp.

Completed—the $5 million, 30 million gal/yr benzene plant at Imperial Oil's Sarnia, Ontario, refinery.

• • •

Planned—a cracking plant to produce ethylene and propylene, at Wesseling, Germany, (near Cologne), by Union Rheinische Braunkohlen Kraftstoff A.G., for completion end-1963. Union has signed an agreement with Farbwerke Hoechst AG and its subsidiary Knapsack Griesheim AG by which Hoechst will purchase most of the 70,000 ton/yr ethylene output for Knapsack's acetaldehyde production. Hoechst will also buy most of the propylene, and a pipeline to transport the olefins is to be built between Wesseling and Knapsack.

• • •

Financing approved—by Argentine government, for Hooker Chemical Corp. to invest in Duranor, Industrias Quimicas S.A. Industrial y Comercial; an Argentine affiliate formed to produce phenol at Rio Tercero, using a Hooker process.

• • •

Planned—a $5 million plant at Grangemouth, Scotland, by Marbon Chemical Division of Borg Warner Corp. and Anchor Chemical Co. Ltd., to make Marbon's line of polymers based on acrylonitrile, butadiene, and styrene.

• • •

Proposed—a $10 million, 120,000 ton/yr, nitrogen fertilizers plant in Lebanon, to use Sidon refinery gases, as a solution to dispute between Trans-Arabian Pipeline and Lebanon over Tapline royalties. Proposal was made by Dr. Munir 'Attiyah, director of Lebanese Industrial Research Institute, and would have Tapline alone bear costs of plant.

• • •

Planned—a $7 million phthalic anhydride plant in Puerto Rico, by Stepan Caribe Inc., a newly formed subsidiary of Stepan Chemical Co., for completion near end-1962, to operate on naphthalene from new plant being built by Commonwealth Oil & Refining Co. at Ponce.

• • •

Planned—a greatly expanded output at Dormagen, Germany, by Erdoelchemie GmbH, during coming several years. Final capacity goals (in ton/yr) are: ethylene, 115,000; ethylene oxide, 36,000; ethylene glycols, 32,000, ethanol, 54,000; propylene, 110,000; propylene oxide, 28,000; propylene glycols, 7,000; acrylonitrile, 25,000; butyraldehyde, 12,000; butadiene, 60,000; isoprene, 12,000; isobutylene, 12,000; diisobutylene and triisibutylene, 45,000; butene-1 and butene-2, 50,000.

• • •

Planned—a $5 million fertilizers plant at Acajutla, El Salvador, for completion about mid-1963, by Fertica de Panama S.A. (composed of International Development and Investment Corp., Standard Oil of New Jersey, Phoenix Reinrohr Corp., and investors from El Salvador, Panama, and Costa Rica).

The same group plans a separate, but interdependent plant at Punta Arenas, Costa Rica, to produce ammonium nitrate and complex fertilizers, at a cost of $8 million.

• • •

Planned—a new ethylene cracking unit (initial capacity 30,000 ton/yr but capable of expansion to 50,000), by Naphtachimie, at Lavera, France, where a recently completed expansion has raised ethylene capacity to 48,000 ton/yr.

• • •

Planned—a "multi-million dollar" diisocyanates plant "in Ontario," by Allied Chemical Canada Ltd., with site likely to be at Sarnia and capacity expected to be in range of 10 to 15 million lb/yr.

• • •

Plans abandoned—by Standard Oil (N.J.) and CEPSA for joint $27 million petrochemical complex in Spain.

• • •

Planned—an $8.3 million, 13,000 ton/yr plant at Goi, Japan, by Ube Kosan, to produce cis-polybutadiene and cis-polyisoprene, under a B. F. Goodrich license, for completion in 1963.

• • •

Planned—a vinyl chloride plant in Israel, by a subsidiary of Electro-Chemical Industries (Haifa), to use Monsanto's ethylene dichloride cracking process.

• • •

Not petrochemicals—the polyethylene plant planned for Pakistan by Manzoor Chemicals Co. and General Industries Ltd. will reportedly operate on molasses as raw material rather than oil or gas.

Contract awarded—by Cities Service Petroleum Co. to Catalytic Construction Co., for engineering, procurement and construction of 50 million lb/yr naphthalene plant to be completed mid-1962 at East Chicago.

• • •

Completed—the 30 million lb/yr isotactic polypropylene plant at Neal, West Va., of Novamont Corp., Montecatini's first USA plant for the polymer.

• • •

Under construction—a $1 million project for the storage of 75,000 bbl of liquefied propylene in an underground granite cavern at Marcus Hook, Penna., by Sunoco Oil Co., for completion by mid-1962. The Contractor is Fenix & Scisson, Inc., Tulsa.

• • •

Planned—a new piperazine unit at Conroe, Texas, by Jefferson Chemical Co., for completion in second quarter of 1962.

• • •

Completed—40,000 ton/yr synthetic rubber plant, by Petrobras, near its Duque de Caxias refinery in Brazil.

• • •

Planned—a 1,800 ton/yr alkybenzene sulfonate detergents plant in Pakistan, by Futehally Chemicals Ltd. of Karachi, for completion early in 1962.

• • •

Planned—a new 3,000 ton/yr tetraethyl lead plant for India, by Indian Commercial Corp. of Bombay, in partnership with Soc. Lavorazioni Organiche Inorganiche, of Italy.

• • •

Planned—new petrochemical facilities at Mizushima, Japan, by Mitsubishi Oil Ltd., with following outputs (in ton/yr): acetaldehyde, 63,200; ethylene, 43,100; propylene, 33,200; acrylonitrile, 7,200; acetone, 15,000; octyl alcohol, 6,000; and for completion end-1963.

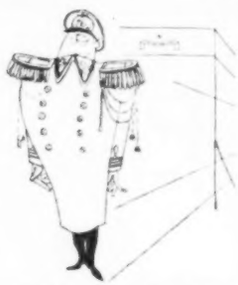
• • •

Proposed—by Singapore government, a petrochemical plant in Singapore. Maruzen Oil Co. Ltd. of Japan, now building a 20,000 b/d refinery there, has been invited to build the petrochemical unit.

• • •

Planned—a 75 million lb/yr styrene plant at Baytown, Texas, by Marbon Chemical Division of Borg-Warner Corp., adjacent Humble Oil's refinery, from which it will obtain ethylbenzene feedstock by pipeline.

• • •



INTRODUCING THE NEW

DRYDEN-EAST

HOTEL

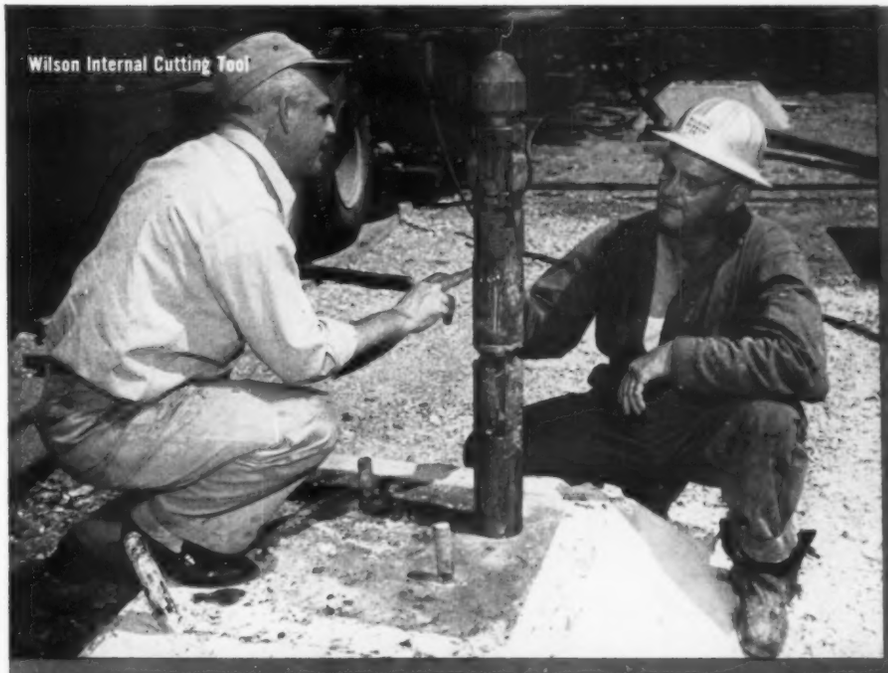
39th St., East of Lexington Ave.

NEW YORK

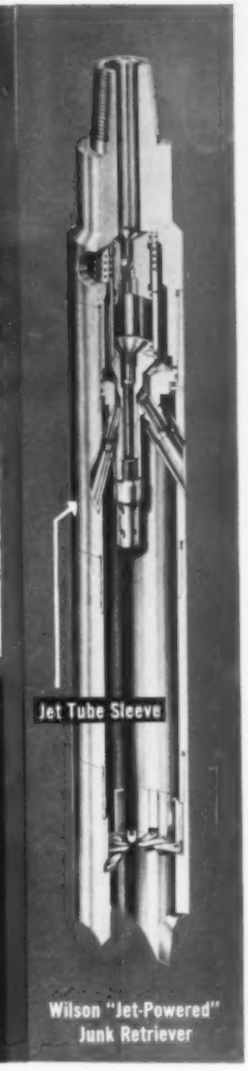
Salon-size rooms • Terraces • New appointments, newly decorated • New 21" color TV • FM radio • New controlled air conditioning • New extension phones in bathroom • New private cocktail bar • Choice East Side, midtown area • A new concept of service. Prompt, pleasant, unobtrusive.

Single $15 to $22 Suites to $60
Special rates by the month or lease

Robert Sarason, General Manager
ORegon 9-3900
Teletype NY-1 4295

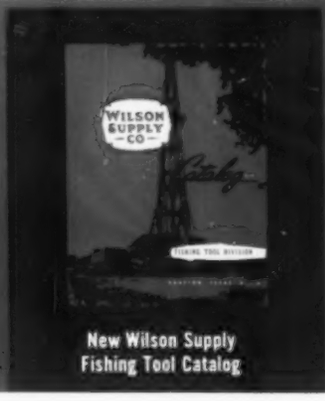


Wilson Internal Cutting Tool



Jet Tube Sleeve

Wilson PS-70 Power Swivel



New Wilson Supply
Fishing Tool Catalog

Wilson "Jet-Powered"
Junk Retriever

When It Comes to Fishing . . .

Wilson has the Tools and the Men!

The Fishing Tool Division of Wilson Supply has the tools and the operators to save you valuable rig time. The new Wilson PS-70 Power Swivel provides torque up to 4000 ft. lbs. with infinite variations of speed up to 100 RPM under load and in either direction. It is the new, compact trailer mounted hydraulic power swivel, designed for medium drilling operations and well remedial work.

The Wilson "Jet-Powered" Junk Retriever is actually two tools in one! Normally the tool is run with the Jet Tube sleeve in place, making it a true, reverse circulation junk retriever. Remove the Jet Tube sleeve and you have a conventional core-type junk basket. It's the field-proven tool for removing junk, non-ferrous materials and bit cones *FAST*.

And Wilson Supply can provide skilled, veteran operators to handle your fishing job anywhere in the free world. For fishing tool service that is complete, contact Wilson Supply. You'll get the right tools for your job and a skilled operator, too, if you wish.

Write for your copy of the new Wilson Supply Fishing Tool Catalog.

WILSON SUPPLY CO
HOUSTON, TEXAS

1301 Conti Street, P. O. Drawer 19, Houston, Texas
International Division
1301 Conti Street, Houston, Texas
1 Rockefeller Plaza, New York 17, N. Y.

Our 40th Year of Service to the Petroleum Industry

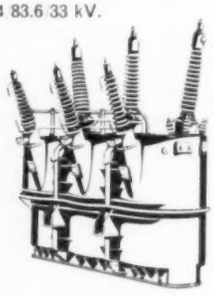
Oil & Gas Supplies • Tubular Goods • Production Equipment • Drilling Machinery • Packaged Compressors • Fishing Tools

6115

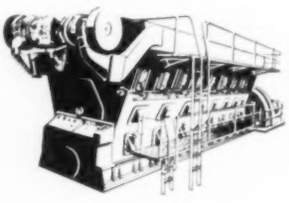
POWER ON CALL

THE WORLD DRAWS GREEDILY on electric power and light. Expanding industry, new oil refineries and petro-chemical factories, and improved transportation call for more and more power. Hawker Siddeley is helping to meet this demand by supplying the vital generation and distribution equipment. Their new subsidiary, Hawker Siddeley Engineering, will engineer and develop comprehensive power schemes—with or without automatic and or remote control—anywhere in the world.

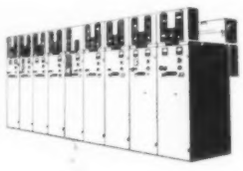
Fuller Electric builds all types of power and distribution transformers. This is one of a pair built for the new cross-Channel D.C. power link with France and believed to be the largest rectifier transformers in the world. Rating is 95/95/65 MVA. 284/83.6/33 kV.



Mirrlees Monarch diesel engines are available as either 6, 8 or 10 cylinder vertical in-line units developing 1600 to 4,340 b.h.p. at 200 to 300 r.p.m. and also in 16 cylinder Vee form developing 7,000 b.h.p. at 375 r.p.m.

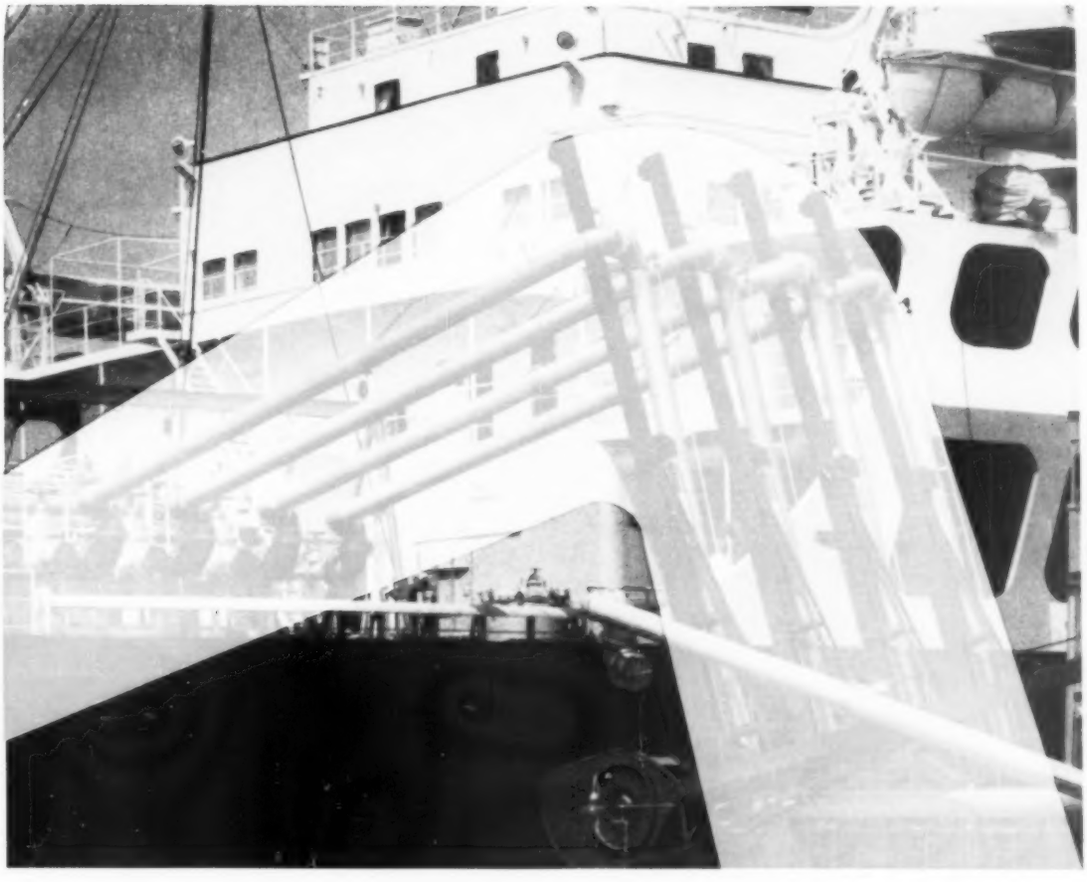


The Brush Switchgear range covers indoor and outdoor equipment for use on electricity supply and general industrial distribution systems of up to 33000 volts, 1000 MVA.



HAWKER SIDDELEY INDUSTRIES

Duke's Court, Duke Street, St. James's, London, S.W.1



CHIKSAN Hydraulic Marine Loading Arms

PROVED

Safer, Faster, More Economical Way to Load Tankers

More than 255 **CHIKSAN** Hydraulic Marine Loading Arms in 36 banks are now in service at progressive ports around the world. Since the first **CHIKSAN** Hydraulic Marine Loading Arm was installed in 1956, there has been no case where a **CHIKSAN** Arm experienced a design failure. Nor has any arm incorporating **CHIKSAN** swivel joints failed in service because of the design of the **CHIKSAN** components.

Made of aluminum and steel, **CHIKSAN** Arms provide the safety, efficiency and economy of all-metal lines. They reduce fluid cargo handling costs by cutting manpower needs, speeding up loading and unloading, and reducing maintenance and repair costs. Let us send you a free descriptive brochure. Send your name and address to –

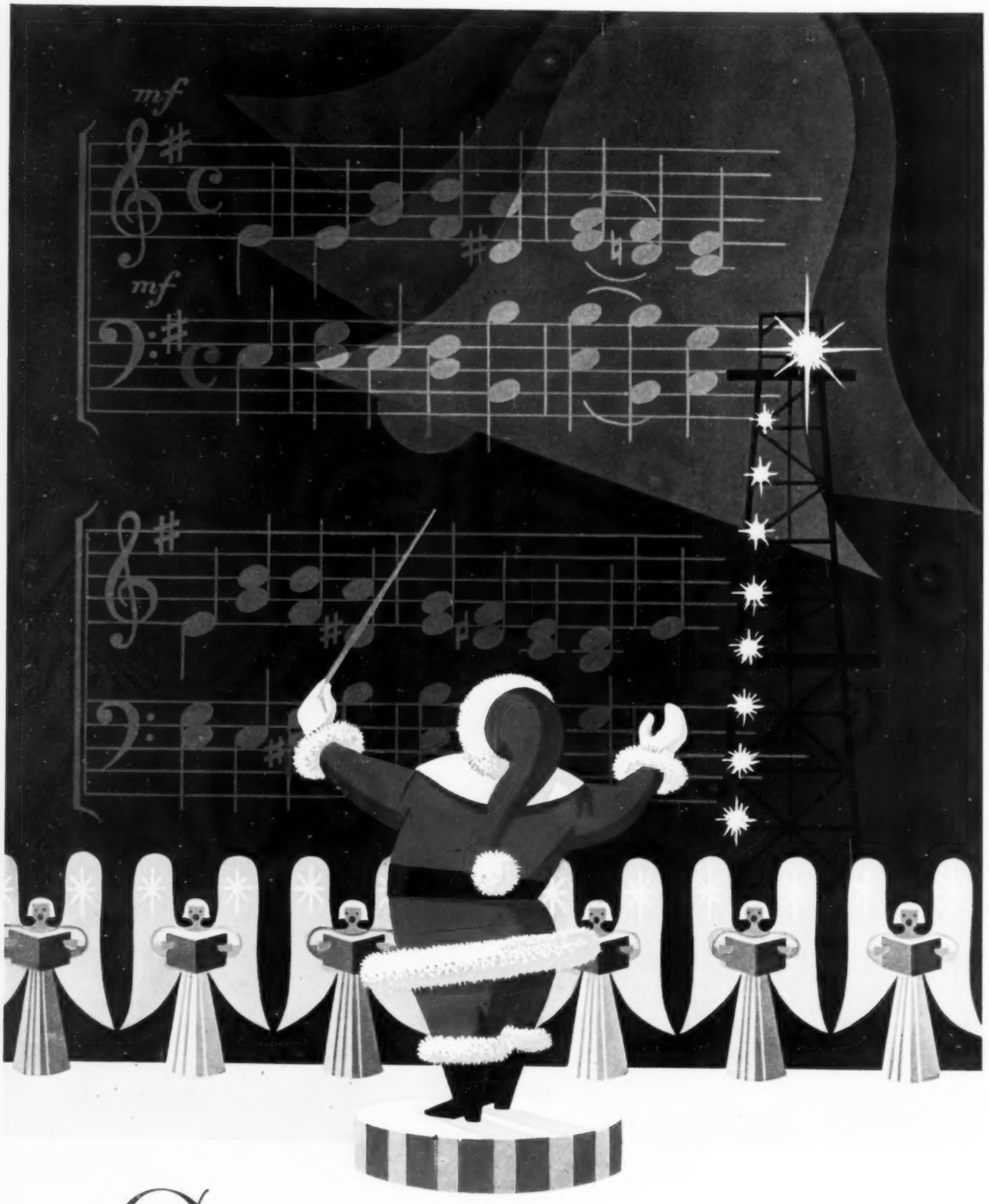
BREA, CALIFORNIA, U.S.A.
A subsidiary of FMC Corporation

CHIKSAN

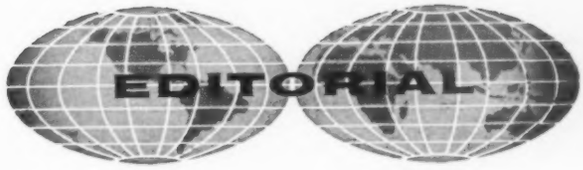
Manufactured by Oil Well Engineering Co. in England, by LUCEAT, S.A. in France and Niigata Engineering Co. in Japan, CHIKSAN International — Offices in principal cities of the world.

Before you retil your docks, investigate the performance of CHIKSAN Hydraulic Marine Loading Arms at these installations . . .

Long Beach, California, U.S.A.	5 banks at piers
Big Island, Pennsylvania, U.S.A.	1 banks
La Salina, Venezuela	4 banks
Puerto La Cruz, Venezuela	1 bank
Sunatra, Indonesia	1 bank
Las Piedras, Venezuela	2 banks
Mina Al Ahmadi, Kuwait	1 bank
Puerto La Miranda, Venezuela	4 banks
Ras Tanura, Saudi Arabia	2 banks
San Pedro, California, U.S.A.	1 bank
Bayway, New Jersey, U.S.A.	1 bank
Baytown, Texas, U.S.A.	2 banks
Kharg Island, Persian Gulf	2 banks
Mizushima, Japan	1 bank
Suez City, Egypt	1 bank
Kawasaki, Japan	1 bank
Yokohama, Japan	1 bank
Melbourne, Australia	1 bank
Queensland, Bay, Brisbane	2 banks



Greetings from **Halliburton**
COMPANY · DUNCAN, OKLAHOMA



Maturity in Oil

The oil companies have become more "mature," according to Minister Abdullah Tariki, speaking for Saudi Arabia at the recent Arab Petroleum Congress. Personnel in some of the oil companies may say the same for Minister Tariki, and maybe both have matured. Anyway, relations between Aramco and the government of Saudi Arabia seem to have eased somewhat, despite the surplus crude oil producing problem throughout the Middle East producing countries and the Russian complications.

But what of Latin America, chief oil exporter in the Western Hemisphere? Nowhere else is maturity and understanding more badly needed. Overlooking the vast panorama of Latin America's oil industry one sees gloom bounded by governmental oil monopolies from its Mexican top to the bottom of Chile's Tierra del Fuego. A country that needs it less than most, Trinidad, has shown the most regular rate of increase in oil production over the past several years. Brazil, who needs it, has not found oil, and may never do so with one government-owned company covering an equivalent area that tens of thousands cannot exhaust in the United States. Chile remains a government monopoly throughout her territory. Colombia has passed oil regulation which seems designed to slow rather than speed the oil search. Bolivia, with enormous transportation problems for its oil, may find a good oil field yet and so should be placed on the hopeful side of Latin America's balance, but this is only a feeble glow.

Venezuela seems determined to carry out policies that have so far caused the rate of reinvestment in the country to drop to rock bottom. Everything the new government tries seems to work out badly. Rent ceilings brought the world's largest concentration of construction and earth-moving machinery ground to a halt overnight. Policy dictates no more oil concessions, result: no reinvestment.

In between these varied examples there seem some slight glimmerings of hope, however. The first is Argentina, nothing startlingly new, but recently the country opened its doors and is all available now for bids, excepting Santa Cruz and the various areas held by YPF or under contract. It was significant in the government's stipulations for these new bids that they foresee for the first time in such contracts the possibility of large oil exports. Argentina has had a phenomenal oil development under the original setup devised to meet that country's problems some four years ago.

On the private side, there is an encouraging sign in Creole Petroleum's decision to set up a company to invest in activities other than oil. For many years the oil companies have said "our business is the oil business—that's all" and devoted themselves to that and that alone. But countries overly dependent on oil worry the oil companies, and national governments have realized the danger of a one-commodity economy for many years. Brazil has tried to break the hold coffee has on her export list and Venezuela has tried unsuccessfully to reduce the importance of oil. Both have succeeded only partially. Both have tried to reinvest funds in diversification without success. An example that comes too well to mind is the $300 million plus that Venezuela's former government spent on petrochemical works—now silently rusting on the Caribbean coast.

Creole's approach is refreshingly new. It may not be the answer; but as Voltaire said, "The most important step is the first one" and it is certainly in the right direction. Investment is a sensitive business, one that requires much planning and judgment unswayed by any but economic factors. Government investment is too often directed by forces that have little or nothing to do with economics. Funds channeled through private enterprise, invested wisely with the invaluable research facilities and energy of a giant corporation behind them, seems a mature approach, made along the right lines.

Cantagallo field and Shell Oil camp: Magdalena River in background. Shell of Colombia photo

Colombia's oil looks up

by E. Ospina-Racines
Consulting Engineer
Bogota, Colombia

Since 1959 some 20 important oil discoveries have been made in Colombia which eventually will compensate the declining oil production. The latter now stands at 145,747 b/d for August. It stood at 152,739 b/d in January 1961 which reveals a 7,000 b/d drop within eight months. As may be observed there are six oil producing operators and among the non-producers Cities Service and Sinclair-BP have fields under development which are most promising.

Of the twelve active oil operators listed, nine are drilling and six are oil producers as may be noted. The largest oil production corresponds to Colpet (Mobil-Texaco), followed by Shell, Texaco (from its fee property) and Ecopetrol, the official oil agency. The latter acquired the De Mares property August 25, 1951, with some 37,000 b/d production and currently it is close to 29,000 b/d of crude and with prospects of increasing this output with newly discovered oilfields. Ecopetrol produces oil and operates the 37,500 b/d refinery which is equipped with catalytic cracking. Ecopetrol also operates the products pipeline from Barranca to Bogota and owns about 50% of the LPG Colgas distributing firm, the balance being held by the public. Colgas obtained a 17% yield on its capital assets in 1960 after taxes. Ecopetrol reported a net profit in 1958 of some $7.47 million on 10 million barrels of oil production and assets of around $147 million giving a yield of 5.1%. This return compared with other official oil agencies in South America reveals that Chile obtains a 11.86% yield, the Argentina YPF 6%, Pemex 5% and Bolivia's YPFB 1%. These data are from annual reports to the various governments.

The wildcatting record of Colombia is given in an accompanying table for the 1907-1960 period—close to a half century of oil exploration compared with the 100th anniversary of the oil industry in the United States. As may be noted, 501 wells have been classified as wildcats—although those drilled before 1931 were shallow, located on surface evidence, and without such guidance are not comparable to the wildcat drilling carried out now, technically and economically. Wells in Colombia cost from $300,000 to $2.5 million. If one assumes

WILDCAT DRILLING RECORD OF COLOMBIA
1907-1957, 1958, 1959 & 1960

Years	Wells Completed Wildcats	Results Oil	Gas	Dry	Total	Oil & Gas Pools Discovered Commer.	Non-Commer.			Ratio of Discovery Success	Coefficient
1907-1957	373	55	4	314	373	23	18	=	41	11%	= 1:9
1958	30	6	1	23	30	2	4	=	6	20%	= 1:5
1959	36	5	1	30	36	4	2	=	6	16%	= 1:6
1960	62	13	4	45	62	4	9	=	13	21%	= 1:5
1907-1960:	501	79	10	412	501	33	33	=	66	13%	= 1:8

Helicopter delivers fuel to equipment building road to Texaco Guavio I wildcat in foothills of Llanos. Texaco Colombia photo

an average of $500,000 the 507 wells may well represent an investment of $253 million. This is not high considering that one operator alone has spent during the past 15 years around $70 million without having discovered commercial oil. The results from this exploration has been the discovery of some 1.6 billion barrels. Of this volume 900 million have been produced and current reserves are of the order of some 700 million barrels. Compared with Venezuela, Colombian oil discoveries average about one-third the volume of oil discovered in Venezuela per wildcat.

Wildcats and oilfields in Colombia are in the Middle Magdalena Valley. At just about the middle at N 1,297,000 and E 1,066,000 coordinates, the Conde and Santos discoveries of Sinclair-BP are located. Just below is Payoa field, discovered by Cities Service-Ecopetrol-Richfield-Pan American, each of which has a 25% interest. The first Payoa well tested 5,400 b/d and the second around 2,200 b/d, so it is a most promising development.

A geological description of the Magdalena Valley has been published in the AAPG publication *Habitat of Oil*, the geologists of the oil operators having contributed the data and it is a most informative study.

Other new discoveries during 1961 are Boquete 1 of Colpet in the Cicuco block with 340 b/d IP Llanito of Ecopetrol now producing about 1,600 b/d from several wells. Some gas wells have been completed by Mecom in a farmout block of Intercol where drilling continues in the search for gas to be piped to Cartagena if some 50 mmscfd are developed. A 20 mmscfd gas 10¾" pipeline was placed in operation during late 1961 carrying gas from Cicuco to Barranquilla where it is sold at 25% discount off fuel oil prices. Gas will be about 25 cents per million BTU. The $8 million project has been financed half by Colpet (Mobil-Texaco) and the balance by Colombian investors.

An LPG plant is now being erected at Cicuco to strip the gas before shipment, built by Colpet. This will add to the LPG supply which has been short lately. LPG consumption is around 1.4 million gal. per month of which some 800,000 g. are from refineries balance from gasoline plants.

Law 10 of 1961 is the new oil code of Colombia, replacing law 31 of 1931—in force for 30 years and under which the present oil industry developed. Existing concessions granted under its provisions continue in effect. In official circles the new oil code was hailed as a measure to promote oil exploration and greater oil developments. In industry circles it is viewed as restrictive and will not increase the payments to the government, nor create incentives for the oil industry. It permits official oil enterprises to acquire concessions if they renounce diplomatic intervention in interpreting the contract. BP is a newcomer as a result of this.

Current net income split is 68% for the Colombian government and 32% for the oil industry. As may be observed, customs duties averaged 8.5 cents per barrel as against royalties of 17.1 cents.

COLOMBIA—OIL CONCESSION EXPERIENCE—30 YEARS OF THE OIL LAW AMENDED IN 1961

Concession Applications Filed	Applications Accepted	Applications Surrendered		Concessions Granted	Concessions Surrendered	In Force
To Jan. 1, 1960		Abandoned + Rejected		23% of 1		12% of 1 (Applications of 1110)
1110	339	385	127	252	114	138
100%	30%	46%		100%	45%	55%

COLOMBIA—1959 OIL INDUSTRY PAYMENTS AND NET PROFIT SPLIT

Item	Pesos Payment	PS./$ Rate	Dollar Equivalent	Dollar Payment P/Barrel (US cents)
1. Customs Duties	Ps. 23.800.000	6.50/$	$ 3.661.500	8.5¢/B.
2. Surface fees	4.100.000		630.700	1.5
3. Royalties	48.000.000		7.384.500	17.1
4. Income Tax Payments	103.600.000		15.938.000	36.8
TOTAL:	Ps. 179.500.000		$27.615.400	63.9¢/B.
5. Net Profit of Operators	106.932.000		16.451.000	38.2¢/B.

6. Crude output 1959 = 53.2 m.B. output of tax paying firms 43.3 million B.
Source: S. J. Martinez, Shell's Public Relations ("El Tiempo" april 26, 1961)
7. Oil Industry Imports in cash equipment and materials in 1959 Ps 102.500.000 = US $ 2.37 per barrel produced
8. Net Profit split in 1959 = 62% for Government and 38% for Oil Industry based on above data. —

Shell Oil ferry on Magdalena River operates between Casabe and Barranca

In addition to the new oil code a new income tax law was enacted. The depletion deduction was granted to the oil industry in 1955 and amended with the new oil code and the regulatory Decree. The Ministry interprets in the Decree the oil law to the effect that the depletion deduction will be granted to operators provided they convert their 1931 oil concession contracts to the provisions of the 1961 oil law. Two suits have been filed to test the legality of the provisions of the regulatory decree. This means that some time will elapse, possibly one to two years before new concessions are granted under the new oil code.

Meanwhile applications are being received by the Ministry for new concessions but most of these are former applications which have had to be split in two in view of the maximum 25,000 hectares and 100,000 hectares in the Llanos now limiting concessions grants. The 1931 oil law granted up to twice this area per concession. The reason for these large grants was the provision of the law that no single operator could have more than two concessions but this provision was annulled in practice by organizing subsidiary firms and finally the provision was revoked leaving the latter areas as maximum, per concession. The new law cuts the areas in half as a maximum, and then half of the block must be surrendered, leaving the grant one-quarter of the original concession.

Oil concession experience of Colombia during the 30 years of the former oil law shows of the 1,110 applications filed for concessions, only 252 were granted or 23% ; of these 45% were surrendered and 138 remain in force or 12% of the original number solicited. Of the 138 at the end of 1960 eighteen were in exploitation as oil producers and 120 in exploration.

The oil concession granting policy together with the 501 wildcats drilled in the half century of oil developments in Colombia resulted in the discovery of 1.6 billion barrels of oil. It is unlikely that the new oil legislation will have sufficient incentives to surpass this record. Worldwide the outlook is for the state to develop its oil resources and Colombia is no exception. Just how far this newly developing policy will go before it is reversed, is a guess.

The restrictive aspects of the oil law for the greater part may be attributed to the fact that Colombia produces 146,000 b/d, consumes 58,000 b/d, and exports around 80,000 b/d. As soon as consumption overtakes production a change in oil policy—an amended oil law with incentives—will be forthcoming. This of course, will be for the future, three to five years hence.

END

OPERATORS IN COLOMBIA & IDENTIFICATION

Oil Producers	
EMPRESA COLOMBIANA DE PETROLEOS (GOVERNMENT)	ECOPETROL
TEXAS PETROLEUM COMPANY	TEXACO
COLOMBIAN PETROLEUM CO. (MOBIL-TEXAS)	COLPET
SHELL-CONDOR S.A.	SHELL
INTERNATIONAL PETROLEUM CO. (COLOMBIA) LTD.	INTERCOL
COMPAÑIA PETROLERA DE NUEVA GRANADA (United Fruit)	GRANADA
Non-Producing Operators	
RICHMOND PETROLEUM CO. (SOCIAL)	RICHMOND
MOBIL OIL CO. DE COLOMBIA	MOBIL
COLOMBIAN CITIES SERVICE PETROLEUM CO.	COLCITCO
JOHN W. MECOM (MAGDALENA OIL CO.)	MECOM
SINCLAIR COLOMBIAN OIL CO. (SINCLAIR-BP)	SINCLAIR
TENNECO OIL CO. (TENNESSEE GAS)	TENNECO

HOW OFFICIAL OIL ENTERPRISES FARE IN SOUTH AMERICA

(Data from Annual Reports of Oil Agencies to Governments)

Country	Mexico	Colombia	Chile	Bolivia	Argentina
Assets in Million $	$ 64	$ 147	$ 126	$ 29	$ 600
Date-Year	31/12/59	31/12/58	30/6/59	31/12/59	1960
Net Income in Million	$ 3.2	$ 7.47	$ 14.9	$ 0.29	$-36.2
Yield % Yr.	5 %	5.1 %	11.86%	1 %	6 %
Oil Output Av./Yr. B/D	289.749	27.533	17.611	8.685	105.584
Rate U.S. cents	Peso	Peso	Peso	Boliviano	Peso
Per Unit-Peso	8.02¢	16.4¢	0.1¢	0.09¢	1.22¢
Personnel:		2.466	3.536	4.457	

COLOMBIAN OIL DATA

Time Year	Crude Oil Output B/D	B/D Runs to Stills	B/D Products Consumption	Year Completions Oil	Gas	Dry	Total	Footage Drilled	Rigs Active Explor.	Field	TOTAL Wells Producing Flow	Pump	= TOTAL
1958	127.587	64.562	46.830	125	1	39	165	948.231					2065
1959	145.830	66.323	53.000	113	3	98	214	1.220.796	11	+ 14 = 25			
1960	152.378	67.886	54.964	79	5	89*	173	1.043.692	7	+ 6 = 13			2143
1961											145	+ 2013 =	2158
JANUARY	152.739	73.568	55.907				18	35.080	10	+ 2 = 12	141	+ 1984 =	2125
FEBRUARY	145.611	36.636	57.742				9	54.457	10	+ 4 = 14	141	+ 2018 =	2159
MARCH	148.752	75.300	64.443				5	52.931	14	+ 4 = 18	139	+ 2023 =	2162
APRIL	145.879	73.844	57.666				2	109.942	13	+ 3 = 16	140	+ 2010 =	2150
MAY	146.426	70.637	60.246				19	70.359	10	+ 8 = 18			
JUNE	145.174	76.901	58.797					63.957	10	+ 10 = 20			
JULY	144.145	71.278	58.001					79.231	11	+ 9 = 20			
								465.957					

* 32 Injection

Sixth World Petroleum Congress planned for Frankfurt in 1963

Top left: Eger V. Murphree, president, Esso Research and Engineering Co., and Chairman of the United States National Committee for the Sixth World Petroleum Congress

Top right: Sir Stephen Gibson, C.B.E., England, Chairman of the Permanent council of the World Petroleum Congress

Bottom left: Dr. Ing. h.c. Guenther Schlicht, president, Deutsche Erdoel A.G., and President of the German Organizing Committee for the Sixth World Petroleum Congress

Bottom right: Dr. Gerhard Brendel, Secretary General of the German Organizing Committee

PLANS ARE NOW being developed rapidly for the Sixth World Petroleum Congress, which will be held in Frankfurt, Germany, in June, 1963. The Congress and a simultaneous exposition of petroleum equipment will take place in the city's spacious exhibition grounds and buildings, which provide 60,000 square meters of hall space and a huge outdoor area.

Centrally located on the Main River, Frankfurt has many excellent transportation facilities serving it from all parts of the world. Attendance at the Congress is expected to be large.

A total of some 250 technical and scientific papers are to be selected for presentation. They will cover subjects in eight major categories: (1) geophysics and geology, (2) drilling and production, (3) processing and refining of oil and gas, (4) base stocks from petroleum and natural gas for the chemical industry, (5) composition, analysis and testing, (6) utilization of natural gas and petroleum products, (7) engineering, including materials and transportation, and (8) operations research, statistics, and training.

In each of the eight sections, an international authority will read a general paper on major developments in each field. These papers will be read at such times that each Congress participant will be able to attend the respective meeting to inform himself on the stage of development in such fields not directly connected with the field of his own immediate interest.

In addition, four principal papers will be read by internationally recognized authorities on subjects of general interest.

The official languages of the Congress are English and French. The language of the country where the Congress is held will also be admitted, in this case German. All scientific publications will be written either in English or French; all information and summaries of the papers will be published in the three languages.

Much of the work of planning the Congress is being done by the Permanent Council of the World Petroleum Congress and by the German Organizing Committee of the Sixth World Petroleum Congress. Sir Stephen Gibson, C.B.E., of England, is the chairman of the Permanent Council. President of the German Organizing Committee is Dr.-Ing. h.c. Guenther Schlicht. Dr. Schlicht is president of Deutsche Erdoel A.G., Hamburg.

Assisting Dr. Schlicht as Secretary General of the German Organization Committee is Dr. Gerhard Brendel. The Committee has established headquarters at Hamburg 1, Glockengieszerwall 2-4, "Wallhof." Inquiries concerning the Congress should be made to that office.

A participation fee of DM 100 per person will be charged, and the fee for each accompanying family member will be DM 50. For registrations received before May 1, 1963 a discount of 20% will be granted.

A United States National Committee has now been formed to plan participation by the American oil industry in the Congress. Eger V. Murphree, president of Esso Research and Engineering Co., will head the group. Vice chairmen are Dr. Jerry McAfee, vice president of Gulf Oil Corp., and Howard B. Nichols, senior vice president of California Texas Oil Corp.

Other committee members are: H. Gershinowitz, president of Shell Development Co.; G. F. James, senior vice president of Socony Mobil Oil Co.; Dr. W. E. Kuhn, general manager, research and technical department of Texaco; G. Roberts, Jr., manager, research department, Pan American Petroleum Corp.; Dr. H. D. Hedberg, vice president, Gulf Oil Corp.; A. F. Kaulakis, vice president—engineering, Esso Research; A. L. Lyman, president, California Research Corp.; and Dr. C. L. Thomas, scientific advisor, research and engineering department, Sun Oil Co.

Also appointed to the committee were Dr. B. C. Belden as secretary, and William M. Craig as public relations manager, both of Esso Research.

Mr. Murphree has served as the organization's top official during the past two congresses as chairman of the permanent council. He was succeeded in that post in 1959 by Sir Stephen Gibson, C.B.E., of England.

The U.S.A. committee expects that about 60 papers by Americans will be presented. Specific topics are now being considered by the committee, which will make recommendations to the Congress' executive committee for final decisions in January, 1962.

Two other groups in Germany are working with the German Organizing Committee for the Sixth World Petroleum Congress. One is the Association for the Promotion of the Sixth World Petroleum Congress 1963. Its managing directors are as follows: J. Baumgarten, a member of the board of directors of Deutsche Shell A. G.; Dr. C. Weber, former secretary-general of the German Mineraloel-Wirtschafs-Verband; and Dr. Ing. O. Zaepke, engineer of the Deutsche Erdoel A. G. The other group is concerned with the Petroleum Equipment Exposition. Its manager is Siegfried Rost, chief of the foreign department, Messe and Ausstellungs GmbH, of Frankfurt.

END

Well Aguaytia-1 of Mobil Oil Co. which found strong gas shows

Bolivia spurs activity in western South America

by Dr. Juan Rassmuss

ALTHOUGH POLITICAL UNREST and social pressure have continued active in all South American countries, no major government interference has lately threatened oil development on the west coast of South America. Oil nationalization threats by oil labor unions in Colombia found little response in the government, and the expropriation campaign of extremistic parties in Peru against International Petroleum Co. has calmed and so far not brought any practical change.

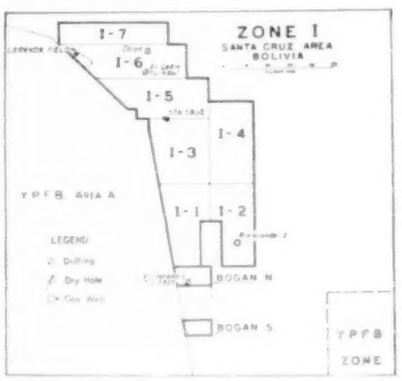
A meeting of South American government oil companies, called at the end of June by the Venezuelan government and the Minister of Mines in Caracas, produced only a series of speeches. The situation of the different countries and government companies in South America is extremely varied. Venezuela has enormous excess of production, while others like Brazil are searching desperately for oil. Some, like PETROBRAS or ENAP of Chile, have a refining capacity which exceeds by far their crude output. ANCAP of Uruguay has only a refinery, while others such as Empresa Fiscal of Peru and the new Venezuelan Oil Corp., produce principally crude. Thus a joint program would serve no special purpose.

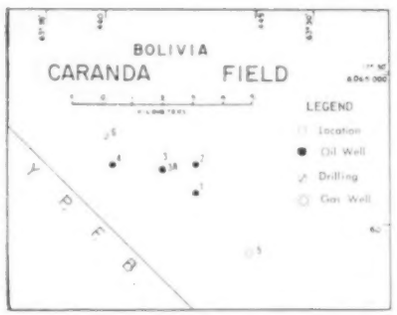
Oil output increased in 1960 in almost all South American countries, but did not yet fulfill demand in several of the most important such as Brazil and Chile, while in Argentina, due to its progressive policy and the active cooperation of foreign companies, this goal shall be reached in 1961.

BOLIVIA

In Bolivia, where political trouble continued and culminated in September 1961 in the resigning of Vice President Lechin, leftish leader of the miners union, output of Yacimientos Petroliferos Fiscales Bolivian (YPFB), the government agency, declined to 3,110,439 bbls or 8,498 b/d in 1960 and averaged 7,724 b/d in the first half of 1961. In July 1961 it amounted to 7,644 b/d. However, for the first time production of private companies contributed in 1960 to Bolivia's output, raising it to a total of nearly 10,000 b/d, and the new discoveries, particularly of Gulf Oil, improve largely the outlook for the future.

YPFB drilled in 1960 a total of 29 wells, of which 23 were producing. 10 wells, drilled in the Bermajo field in the south, were all successful. The Camiri field with 7,215 b/d yielded the bulk of the output. Bermejo fields contributed with 1,228 b/d, and the Sanandita field, where no new drilling was carried out, yielded only 55 b/d from seven old wells. By deeper drilling in several abandoned wells in Camiri favorable results were obtained, improving prospects. In the first seven months of 1961 16 new wells were drilled by YPFB, of which 12 yielded oil. Footage amounted to 73,122 ft, an average of 4,570 ft. At the end of 1960 a number of 125 wells were producing, of which 84 flowing and 41 pumping. Average yield per well was 68 b/d, but average yield of the Camiri wells was 83 b/d. In July 1961 a total of 123 wells were producing, of which 76 flowing and 47 by pump.





YPFB completed in August 1961 a successful wildcat at Sipuati, east of Villa Montes with a yield of 627 b/d plus some 750,000 c.f. of gas from around 3,600 ft depth.

Private foreign companies hold a concession area of 9.24 million hectares or around 22.5 million acres, including the Gulf Oil holdings in the YPFB area, the former McCarthy concession, reduced now to around 180,000 hectares, and held by Chaco Petroleum Co. of Tennessee, and the Madrejones concession of Bolivian Oil Co. of the Fish group. A newcomer, Bolivian Texas Co., an independent not affiliated with Texaco, relinquished its concession of around 500,000 hectares. Four Brazilian companies hold in the former Comision Mixta area more than 1 million hectares.

Private companies completed in 1960 14 wells with a total footage of 130,983 ft. Two wells of Bolivian Oil Co. at Madrejones and Caranda 1 and 2 of Gulf Oil were producers. Bolivian Oil Co. added from its two first flowing wells in Madrejones an output of 463,693 bbls to Bolivia's production in 1960. In the first months of 1961 output of Madrejones averaged

BOLIVIAN GULF OIL CO. DRILLING DATA

Caranda Field

Two wells (Caranda-1 and 2) have been completed in the Taiguati formation (Permo-Carboniferous) at approximately 6,000 ft. Both flowed 50° gravity clean oil at rates above 300 b/d on ¼ inch chokes with surface flowing pressures approximating 800 psi. Two others (Caranda-3A and 4) have been completed with somewhat higher initial productions from the Petaca formation (Tertiary) at about 3,500 ft.

A fifth well (Caranda-5) was recently completed flowing 5.5 mmcf/d of gas on a ½-inch choke from approximately 2,300 ft. Surface flowing pressure was 750 psi.

One medium rig is currently operating in the field.

Rio Grande

Rio Grande-1 was completed in September, 1961 flowing 9 mmcf/d of gas on a ½-inch choke from a Tertiary sand at 5,200 ft, with surface flowing pressure of 1,475. Condensate accompanying the gas averages 36 barrels per million cubic feet. A confirmation test is currently rigging up two kw north of the discovery.

Currently Drilling: Colpo-1 drilling ahead below 7,700 ft.

Wells Abandoned or Suspended:

	Total Depth in ft
Mandeyapecua-1	11,623
Mandeyapecua-2	6,500
Mandeyapecua-3	6,285
Yaay-1	15,257
Mitaigua-1	12,012
Bayuibe-1	12,784
Victoria-1	7,236
Victoria-2	7,015
El Cedro-1	14,861
El Dorado-1	13,285
Caranda-3	4,114

Stratigraphic Tests:

13 tests	58,000 total

around 1,000 b/d, which are pumped to the neighboring Argentine field and to the pipeline to Rosario in Argentina, built also by the Fish Engineering Co. and associates. Output in May was 1,009 b/d from Madrejones 1, 2 and 6. Well 7 is drilling. Grade of the crude is 56° API.

Gulf Oil Co. of Bolivia drilled in 1960 five wildcats in the area east and southeast of the Camiri region, which remained dry, but discovered two producers in Caranda, a new field located about 30 miles northwest of the town of Santa Cruz. Well Caranda 1 yielded 334 b/d and Caranda 2 yielded 447 b/d.

Well Caranda 3a, completed in 1961, yielded from 3,430 ft 800 b/d and 500,000 c.f. of gas. Well Caranda 4 with a final depth of 4,059 ft yielded 1,570 b/d from a depth of about 3,600 ft and Gulf Oil announced the discovery of a large oilfield, the structure about 10 miles long and the thickness of the oil sand possibly exceeding 100 ft. Grade of the crude is about 50° API. Caranda 5 is drilling.

Gulf made another discovery in its Rio Grande 1 wildcat, about 36 miles southeast of Santa Cruz with 12 million cubic feet of gas daily. The well is drilling deeper.

Bolivian California Oil Co. jointly with Shell spudded a wildcat at Monteverde southeast of Santa Cruz, drilled by Loffland Bros. with a particularly light rig, built mostly of aluminum. Depth was around 13,000 ft in mid-1961.

Santa Cruz is connected by a YPFB 4½" pipeline with Camiri and from there with Yacuiba on the Argentine boundary, and also by the Andean pipeline, which so far has been lying idle, to Arica on the Pacific Ocean. A large oilfield in the Santa Cruz region may have an easier outlet in the big Brazilian market, via a railway already running from Santa Cruz to Corumba and from there to Sao Paulo. One of the ambitious projects of PETROBRAS is construction of a 1,000-mile pipeline from Sao Paulo to Bolivia.

Chaco Petroleum Co., subsidiary of Tennessee Gas Transmission Co. and associates, after drilling four deep dry wildcats on the Chaco border in the former McCarthy concession at Agua Salada and Palo Marcado, made an important discovery in its fifth wildcat. Algarobillo 1, at 12,967 ft depth, about 40 miles northeast of Yacuiba, yielded 317 b/d of 56° API crude and 6.8 million c.f. of gas daily. A second well has been spudded.

Recent discoveries in Bolivia offer a bright outlook for the future oil development and for strengthening the economy of the country, depending so far on a declining mining production.

CHILE

In western South America oil development in Chile continued its steady progress. However, two new facts marked the oil industry: i.e. the increasing development on the continent due to discovery of the Daniel oil field; and Posesion gas field, east of the Punta Delgada field, the latter also opened in recent years, accompanied by successful drilling in the sea in the Magellan Strait, and the start of drilling in northern Chile.

Crude output in Chile increased in 1960 by 12% to 1,149,604 cubic meters or 7,230,779 bbls and to 19,756 b/d from 17,611 b/d in 1959. In 1961 output rose from 21,730 b/d in January to 26,905 b/d in July 1961, and yielded an average of 22,250 b/d for the first semester of 1961, nearly 13% more. A further increase is expected by full development of the Daniel field, east of Punta Delgada, on the mainland, discovered in 1960. A 47 miles 8" pipeline will connect this new field with the 8" pipeline from Punta Delgada to the new terminal of Gregorio on the continent, completed in 1960.

Also below the Magellan Strait oil was found 1,000 meters from the coast by a directional offshore well from Daniel Este Nr. 3.

Yield of the Cullen Field remained by far the most important and supplied in 1960 half of the total production or 3,613,427 bbls total. In the first three months of 1961 output of the Cullen field amounted to 148,684 cubic meters from a total of 313,622 cubic meters.

From Cullen field, where a new gas and gasoline plant for around 100 million c.f. daily will start operating at beginning of next year, a new pipeline of 4½" diameter and 69 miles length is being constructed to the terminal of Puerto Percy.

On the mainland, output of Punta-Delgada and Daniel fields increased to 2,520 and 925 b/d respectively in the first quarter of 1961. Mainland fields already provide 15% of total output.

In the year 1960 only 56 wells were drilled against 90 in the former year, but 28 of them or half yielded oil, 7 gas and 21 remained dry, and from 23 development wells 18 yielded oil, 2 gas and only 3 remained dry. Because of this higher success ratio, output was almost equal to the former year. However, in 1961 drilling was speeded up and in the first six months of 1961 a total of 42 wells was completed, of which 32 yielded oil and 2 gas (a success rate of 80%) and only eight wells were dry. Four rigs were active as in the former year. In July 1961 seven wells were completed: four oil wells, one gas well and two dry holes.

Footage, which in 1960 had declined to 411,547 ft against 620,412 ft in the former year, rose to 325,195 ft for the first seven months of 1961.

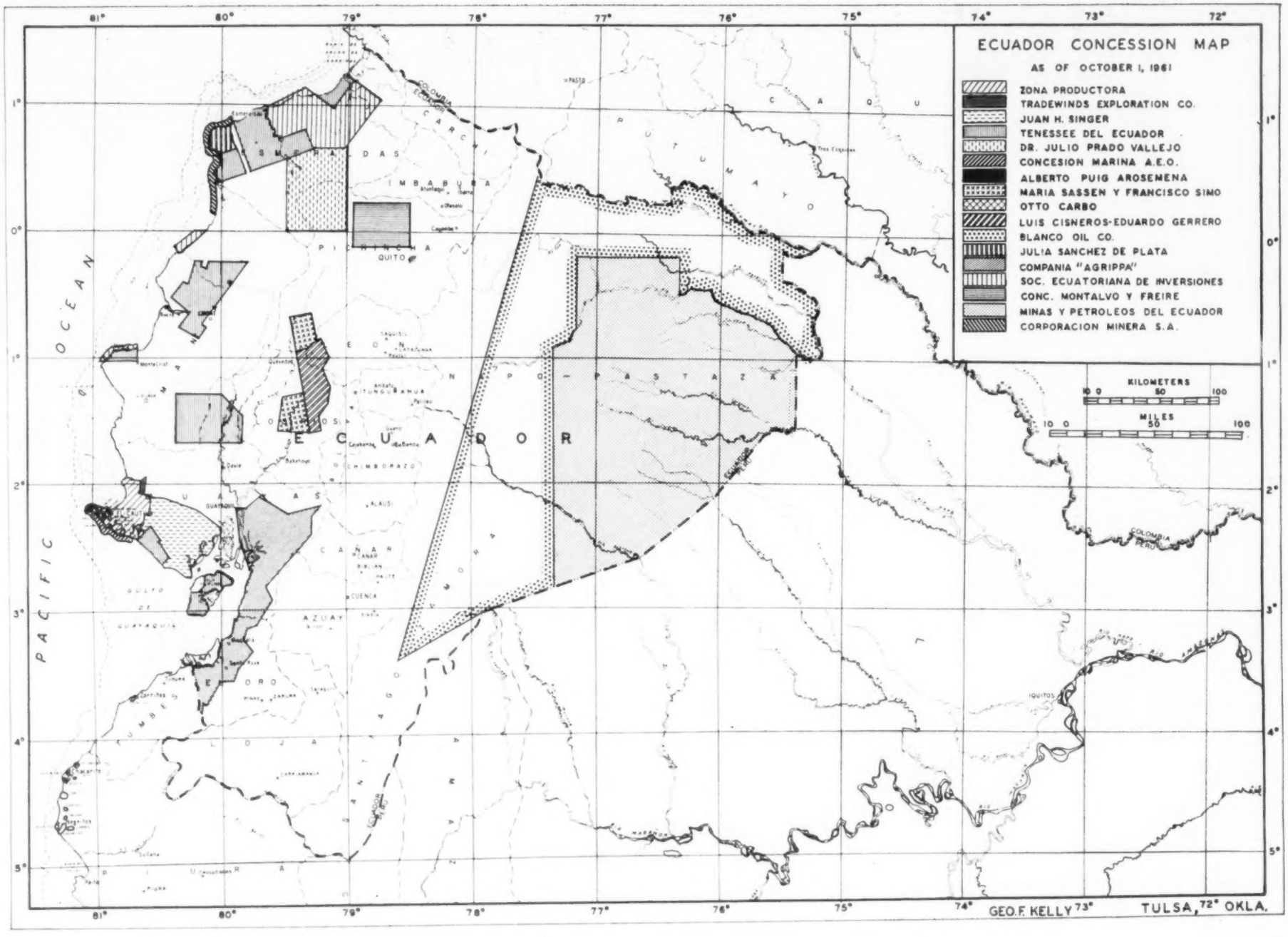
The number of producing wells rose from 125 in 1960 to 135 in 1961, more than 90% of them flowing. Average yield per well in the first semester of 1961 was around 165 b/d. Average depth drilled was about 6,550 ft.

Oil development of the Magellan fields, in which operation Empresa Nacional del Petroleo, the government agency, completed its tenth anniversary in 1960, continued its steady upward trend. The future is considered bright, particularly because of spectacular results in the neighboring Argentine fields in Tierra de Fuego island, where Tennessee of Argentina has already reached an output of 20,000 b/d.

Exploration in southern Chile was extended to a much wider area and a wildcat was spudded on the continent in the foothills of the Andes Mountains about 50 miles north of Puerto Natales and north of Laguna del Toro. It was drilling on April 1 at 1,355 meters depth. Another wildcat was drilled at Evans in the southern part of Tierra de Fuego island to 14,000 ft depth, was dry.

For the first time Empresa, after geological, gravimetric and seismic surveys for several years, started drilling in northern Chile. On January 19, 1961, the first wildcat was spudded at Pintados in the province of Tarapaca, about 4 miles from the railway station of Pintados and about 50 miles southeast of the port of Iquique. Drilling was carried out by Loffland Bros. as contractors. The well reportedly passed a thick section of lava beds below some 5,000 ft depth and was abondoned dry at 2,475 meters (about 7,425 ft). Some 5 miles distant wildcat Pintados 2 was spudded, also abandoned dry at 1,015 meters (about 3,045 ft).

Another wildcat was spudded at Peder-


ECUADOR CONCESSION MAP
AS OF OCTOBER 1, 1961
ZONA PRODUCTORA
TRADEWINDS EXPLORATION CO.
JUAN H. SINGER
TENESSEE DEL ECUADOR
DR. JULIO PRADO VALLEJO
CONCESION MARINA A.E.O.
ALBERTO PUIG AROSEMENA
MARIA SASSEN Y FRANCISCO SIMO
OTTO CARBO
LUIS CISNEROS-EDUARDO GERRERO
BLANCO OIL CO.
JULIA SANCHEZ DE PLATA
COMPANIA "AGRIPPA"
SOC. ECUATORIANA DE INVERSIONES
CONC. MONTALVO Y FREIRE
MINAS Y PETROLEOS DEL ECUADOR
CORPORACION MINERA S.A.
KILOMETERS
MILES
ECUADOR
PACIFIC OCEAN
GEO.F. KELLY TULSA, OKLA.

nales in the province of Atacama, where oil seepages are found in the Salar de Pedernales. It was drilled by Santa Fe Drilling Co. as contractor and abandoned dry at 2,267 meters. Pedernals No. 2 was drilling in October. Another wildcat was being drilled during October at Dolores, near Zapica (north of Iquique).

Run of the national Concon refinery, north of Valparaiso, of 44,000 b/d capacity increased in 1960 to 1,659,510 cubic meters (10,438,011 bbls or around 28,500 b/d) of which 66% came from domestic crude and the balance of nearly 3.6 million bbls was imported from Venezuela.

In the first semester of 1961 average refinery runs amounted to 30,322 b/d, which satisfies more or less the domestic demand of gasoline. Fuel oil, required by the big copper mines in the north, is imported directly.

PERU

In Peru, a significant recovery of the oil industry in 1960 increased the output by 8.4% to 19,255,034 bbls or 52,609 b/d. Development slowed in 1961 and production declined slightly. Although the nationalization campaign, fostered by one of the principal newspapers, against International Petroleum Co. has calmed down, and no change of petroleum legislation has been enacted so far, the uncertain result of the approaching presidential elections, to be held in 1962, and fights of the different political parties are causing a cautious and somewhat restrained approach to economic activity.

In the coastal fields there has been an increase in the output of the Lobitos fields, which raised production by more than 1 million bbls in 1960. This permitted the parent company, Lobitos Oilfields Ltd., in London, after a period of losses to distribute a substantial dividend.

International Petroleum Co., according to a press comment, had a profit of 10.3 million dollars in 1960 in Peru, corresponding to a 6% interest on its total investment in Peru of 176 million dollars.

In the Peruvian Amazon Basin, renewed drilling activity by Mobil Oil and Cerro del Pasco Petroleum Corp. brightened the picture.

Crude output of International Petroleum Co.'s Brea-Parinas field, which in 1960 amounted to 8,083,274 bbls for the entire year, declined in the first semester of 1961 to 3,791,732 bbls or nearly 9% against 4,143,106 bbls in the same period of 1960, although several new pools were opened. However, condensate production increased to 401,246 bbls against 382,555 bbls in 1960. Recovery increased to 1.64 gal per 1,000 c.f. of gas.

In 1960 a total of 36 wells were completed in Brea-Parinas field, of which eight were dry. Footage amounted to 175,382 ft. In 1961 drilling accelerated and in the first six months 28 wells were completed, of which only two were dry. Footage amounted to 126,031 ft. Producing wells on June 30, 1961 totaled 1,230 oil and 13 gas wells, of which 157 were flowing, an increase of 20 flowing wells, due to new outputs. 63 wells served for gas injection and 89 wells for water injection for secondary recovery. At the end of 1960 a total of 1,225 wells were producing with an average yield of 18 b/d and a total of 22,085 b/d.

In the Lobitos fields of Cia. Petrolera Lobitos, also operated by International, output rose in 1960 to 8,695,032 bbls or 23,757 b/d. In the first semester of 1961 it reached 4,344,671 bbls against 4,120,970 bbls in the same period of the former year. However, only 12 wells were completed, of which two remained dry, while in 1960 a total of 44 oil wells and two dry holes was drilled with a total footage of 255,009 ft. Footage in the first semester of 1961 amounted to only 65,500 ft. Total number of wells at the end of 1960 was 730, of which 122 were flowing. On July 1, 1961 the total was 621, of which 100 were flowing. Five wells were used for gas injection. Yield per well increased to 38 b/d, more than double that in the old Brea-Parinas field. 96,141 bbls of natural gasoline were produced in the first six months of 1961 by a yield of 1.44 gal from 1,000 cubic feet of gas.

Empresa Petrolera Fiscal, the government company, in 1960 produced 968,590 bbls from 185 wells at the end of the year. It yielded in the first semester of 1961 a total of 466,175 bbls. Output, which is slowly declining in Organos field, was improved by new developments in the Sector Peru and Tunal areas in the southwestern corner of its concessions, and in July 1961 increased to 85,666 bbls. Yield per well in 1960, with an average output of 2,646 b/d, was 14 b/d.

In the most northern part of the coastal area, near the mouth of the Tumbes river and the Ecuadorian boundary, according to seismic surveys the middle and upper Tertiary sequence increase in thickness to the Gulf of Guyaquil. The oilbearing Eocene section terminates farther south. Empresa drilled a wildcat by Santa Fe Drilling Co. as contractor to a depth of 14,148 ft, the deepest well in Peru, which remained dry in reportedly oligocene deposits.

Belco Petroleum Corp. of New York, which in 1960 obtained an output of 379,190 bbls from 22 flowing and 10 pumping wells at the end of year, continued actively and successfully the development of their concessions, acquired from the former Petrolera Peruana. In the first six months of 1961 Belco completed four wells in the Mirador concession, where the total number amounts now to 36, and six directional offshore wells with a total footage of 38,714 ft. A total of 15 directional offshore wells has been completed so far and two underwater wells, both producing, drilled by Richfield's drilling barge *Rincon*. Output for the first seven months of 1961 amounted to 371,930 bbls, of which 112,795 bbls were produced from litoral wells. In July output amounted to 57,846 bbls, of which 25,580 from offshore.

The company has started now drilling in the most southern part of its concession, adjoining to the north the abandoned concession Peoco 7 of Texas Petroleum Co., and completed wildcat SX 38 to 5,200 ft depth, having spudded a second farther north and evaluating the results. Belco also proposes to start drilling from the shore in the Talara area to its Talara offshore concession.

Petrolera Amotape, production of which had declined in 1960 to a total of 64,970 bbls, declined further sharply in the first semester of 1961 to 22,177 bbls total. Drilling has been mostly suspended. It surrendered 7,295 hectares or about 1/3 of its concession.

Peruvian Pacific Petroleum Co., subsidiary of Cities Service and Richfield, continued underwater drilling by the drilling boat, Rincon. Well Humboldt 3-3, connected by a submarine pipeline with the shore, yielded about 90 b/d. Humboldt 1-1 with a similar output was placed on production. The company has also started to drill its first directional well from the shore to the Salinas formation to a projected depth of 6,300 ft. It was drilling in August at 3,245 ft depth.

Peru has remained the only country on South America's Pacific coast where oil is obtained from the continental shelf, although an economic return of the underwater wells drilled in deeper waters is still questionable.

In eastern Peru's Amazon basin, Ganso Azul's output in 1961 amounted to 377,268 bbls total for the first six months, slightly less than in the former year. Output depends on shipping facilities and amounted in July to 61,809 bbls or 1,994 b/d.

The Maquia field of Oriente Co. and associate German companies produced in the first six months of 1961 a total of 89,092 bbls. Cumulative production until June 30, 1961, has been 233,602 bbls. The company has acquired two new tugs and three new barges of 8,000 bbls capacity each, shipped from Houston, by which it expects to raise shipping to about 48,000 bbls per month, which corresponds more or less to the potential of the 10 wells drilled so far.

Wildcatting has been renewed actively in the Amazon basin. On January 1, 1961 Mobil Oil, associated 50-50 with German companies and with Oriente Co. as concession holder, spudded its first well, Zorrilos 1, on the mouth of the San Alejandro river into the Aguaytia, on a broad anticlinal structure. Drilling was carried out by Loffland Bros. and the rig shipped by the Amazon river. It reached at 5,398 ft depth the bottom of the tertiary Red Beds, but found only slight shows in the Cretaceous Agua Calinete section and was abandoned at 8,883 ft. A second well, called Aguaytia 1 was spudded about seven miles to the northwest. It struck strong gas pressure and some condensate in the Cretaceous at 8,366 feet, which may indicate a gas cap of an oil deposit, but got stuck by a fishing job and had to be sidetracked, and was continuing drilling as this report was written.

Cerro de Pasco Petroleum Corp., whose parent company consumes about 450,000 bbls of petroleum products yearly in its

mining operations in the high Cordillera to the west, spudded its first wildcat in January in Iscozazin on a faulted anticlinal structure in the region of the Palcazu river, an affluent of the Pachitea, on which near its mouth into the Ucayali Ganso Azul is located.

The location is about 100 miles in straight line distant from Ganso Azul. The Iscozazin well reportedly passed only a reduced Cretaceous section, a thick salt formation, hard Jurassic sandstones and was abandoned in August 1961 at 10,333 ft in red Triassic sandstones of the Mitu formation. A second wildcat, three miles to southeast on the same structure was spudded and was drilling at end of September at 1,131 ft.

The other major companies continued ground surveys.

Total crude output of Peru in the first six months of 1961 amounted to around 9,425,000 bbls.

International's Talara refinery processed in the first semester of 1961 a total of 8,209,577 bbls of crude. The national refinery at Conchon south of Lima, for which engineering is being done by Fluor Corp. of Los Angeles and future operation by Standard California, was scheduled to be completed by the end of 1961.

International Petroleum Co. exported in the first six months of 1961 1,337,228 bbls, mostly of products, with a value of nearly five million dollars. It was shipped principally to Chile, New Zealand and Indonesia. Lobitos Co. shipped crude to the Ellesmere refinery of its parent company in England. Total exports are restricted by law to a maximum of 20% of the output for protection of the domestic demand.

COLOMBIA

Colombia's crude production in 1960 was 152,378 b/d. It declined after January 1961 to around 145,000 b/d. In July 1961, it amounted to 144,145 b/d and in August to 145,747 b/d. However, new discoveries have increased largely its potential.

Colombian Petroleum Co. (Mobil-Texas) remained the largest producer. Decline of production from the Barco concession was largely offset by the high output of the Cicuco field, which in 1960 yielded around 23,000 b/d and almost equalled output of the Barco concession. The Cicuco field is also being connected by a gas line of 10¾" diameter and 140 miles length with Baranquilla for providing energy to the principal port of Colombia. Output of Colombian Petroleum Co., which amounted in January 1961 still to 48,508 b/d, declined also slightly to some 46,000 b/d in April-May and to around 44,000 b/d in July-August 1961.

Shell and Texas Petroleum Co. were almost equal in 1961, yielding each in January around 38,000 b/d and Shell in August 36,810 and Texas 35,255 b/d.

The output of Empresa Colombiana de Petroleo, the government agency, amounted in January 1961 to around 27,000 b/d, similar to the former year. It increased in August to nearly 29,000 b/d. The discovery of the Llanito pool in the De Mares concession northeast of Barranca Bermeja, where the discovery well Llanito 9 yielded 3,120 b/d in the test, should raise its output further and enable Empresa to supply the requirements of the 37,500 b/d Barranca Bermeja refinery, operation of which it took over from International Petroleum Co. on March 31, 1961, after expiration of the leasing contract. Empresa also cancelled the contract for secondary recovery with Forrest Oil Corp. of Bradford, Pa. against a payment of six million dollars to Forrest.

International Petroleum Co.'s output from the small Totumal and Aguachica fields remained stagnant at about 200 b/d in 1961. United Fruit's subsidiary, Nueva Granada, produced also some 200 b/d from the Lebrija field, more or less the same as in 1960.

In March 1961 a new petroleum law was enacted in Colombia, which raised the surface rentals, formerly paid in devaluated Colombian pesos, to an equal amount in dollars. Royalty, which was previously varying according to the distance from the coast, was uniformly fixed at 14½% and 11½% for the Llanos. Area of exploration concessions was reduced to half, 25,000 ha. for western Colombia and 100,000 ha. for the Llanos region. After proving of commercial oil, the area must be reduced to 50%, the reverted extension to be offered for better bids. Drilling obligations are also doubled and depletion allowance reduced. The new conditions are undoubtedly more onerous, but the government considers them equitable and more suitable for a just 50-50 split. However, attitude against foreign capital remained friendly and fair, as demonstrated by the arrangement with Forrest.

Important discoveries augmented the potential oil resources. In the middle Magdalena region the British Petroleum-Sinclair group, which only recently entered the country, in August 1960 completed Santos 1 wildcat, 9,964 ft deep, with a yield of around 1,000 b/d. Santos 2 had a yield of 980 b/d and Conde 1 and 2 were completed as producers. Six producing wells, completed so far, yield a potential of 6-7,000 b/d. British Petroleum reportedly proposes to raise its investment to 50 million dollars and to build a pipeline to its new field.

Shell enlarged its Cristalina discovery of 1959, located to the northwest, by well Cristalina 4, 12,258 ft in depth with a yield of 1,200 b/d.

Largest discovery was Payoa 1, located between both discoveries, drilled by Empresa, Cities Service, Richfield and Pan American with a 25% each. It yielded 5,400 b/d from five pay zones from 6,895 to 8,388 ft depth. Well Payoa 2 of 9,997 ft depth, yielded 2,200 b/d of 36° API crude in the test. Well Payoa 3 is drilling.

In the Caribbean area John W. Mecom of Houston enlarged his gas discoveries in the Jobo-Tablon area, and a 50 million cubic feet daily gas line to Cartagena is projected for the petrochemical plant of International.

A newcomer, Tennessee Overseas, is drilling a wildcat near Neiva in the southern Magdalena valley at 10,000 ft depth.

The first discovery of oil east of the Andes in the Llanos region by Texas Petroleum in 1960, the Guavio well, yielded 550 b/d, but well Guavio 2, drilled to 9,186 ft depth, was abandoned. Well Guavio 3 has been spudded.

Around 20 rigs average were drilling in 1961 in Colombia and new discoveries have given a strong impulse to Colombia's oil development.

ECUADOR

In Ecuador, crude output declined only slightly in 1960 to 2,798,920 bbls or 7,647 b/d against 7,734 b/d in the former year. In 1961 production started to increase, particularly in Anglo Ecuadorian fields and in the first semester of 1961 reached an average of 8,359 b/d. In July 1961 it amounted to 8,400 b/d. Anglo Ecuadorian Oilfields Ltd., in which the parent company Lobitos Oilfields Ltd. in London, and Standard (N. J.) hold the controlling shares, produced 6,963 b/d in 1960, about 91%. Tennessee del Ecuador dropped to 684 b/d.

In the first seven months of 1961 a total of 46 wells were completed, of which 42 yielded oil and only four remained dry. Footage increased to 131,100 ft. Seven rigs were active in 1960 and six to nine rigs in 1961. Number of producing wells, which at the end of 1960 was 1,703 total, of which only 22 were flowing, and which yielded an average of less than five b/d, was sharply curtailed to around 1,050 producing wells in 1961. Average yield increased to over eight b/d in July 1961.

No new drilling was carried out in the large tertiary coastal belt north of the Sierra de Colonche, which limits the Santa Elena peninsula to the north. California del Ecuador, subsidiary of Standard California, suspended operation, and The National Co. surrendered its large concession.

However, the few wildcats drilled in the extended northern coastal area do not yet permit any definite conclusions on prospects, but low taxes and royalty in Ecuador favor further exploration.

Refinery runs of Anglo Ecuadorian's Libertad and Tennessee's Cautivo refinery were 11,559 b/d in 1960. Demand, which amounts to 11-12,000 b/d, requires increasing imports.

In eastern Ecuador Shell, associated with Standard N. J., had ceased operation in the Amazon Basin after ten years and drilling six wildcats in marginal areas under most difficult access and transport conditions. New activity is expected, and Norsul Oil & Mining Ltd. of Calgary, Canada has taken over the Cia. de Minas y Petroleo del Ecuador, to which was granted in August, 1961, the Pastaza concession of about 10.8 million acres, covering eastern Ecuador's Oriente from the foothills of the Andes to the Peruvian boundary in the east and the Napo ricer to the north. END

Discovery well, Petrobras' Mapele-2 in Bahia, an important wildcat in Brazil's exploration activities, has been scene of spectacular fire since August

Mapele discovery aids Brazil's exploration

SPARKED LITERALLY, by a spectacular fire which broke out August 24th and is not yet under control, an important wildcat—Petrobras' Mapele-2 in Bahia state—has given a lift to Brazil's exploration activities.

The well, producing an estimated 10,000 b/d, is believed to be one of the most important in the Reconcavo, the first of a new field.

Brazil's manufacturing and transportation facilities also are getting a big boost as the result of several big projects in the works by Petrobras. Among them are:

(1) A 300-mile pipeline from Rio de Janeiro to Belo Horizonte, (25,000 b/d capacity) construction on which is to start next year.

(2) A new 25,000 b/d refinery at Porto Alegre, the capital of the state of Rio Grande do Sul, with construction to start in 1962.

(3) A new ocean terminal at San Sebastian, to start building in 1962.

(4) A new natural gasoline plant in Bahia state, capacity of which will be 50 mmcf/d raw gas; for completion in 1962.

(5) Three new downstream processing units at the Cubatao refinery; construction to start next year and completion expected about the end of 1963.

(6) Additional petrochemical facilities for the synthetic rubber plant (40,000 ton/yr of SBR) just completed next to the new Duque de Caxias refinery at Rio; including 29,000 ton/yr of butadiene and 15,000 ton/yr of styrene; both to start construction next year and be completed first quarter of 1964.

Exploration: Petrobras has adopted the system of subcontractors for geophysical services and two specialized companies are now working on the basis of payment per meter drilled.

Engineer Geonisio Barros, president of Petrobras, addressing the Sao Paulo Federation of Industries in August, described some of the problems of the state enterprise. Production of commercial oil in Brazil, he said, is obtained exclusively from fields of arenite formation; i.e., those of moderate yields and long life, and not, so far, from limestone formations, as happens in the Middle East, where output per well is high, but life short.

Referring to the Link report, he said the Board of Directors had ordered a revision of the classification therein submitted, which they considered too pessimistic. In accordance with the instructions of ex-President Janio Quadros, research is being intensified outside Bahia, in the Amazon region and Parana, and has been resumed at Barreiros, in Maranham, and in the Alagoas Basin. These areas were previously classified as showing no signs of oil, but are now considered more favorably. By mid-August Petrobras had drilled fifty wildcats.

In the Maranham Basin, MA-1-PI, at Meruoca, near Teresina, capital of Piaui, was last reported as having reached a depth of 3,041 ft. Three wildcats and two strats were then drilling in the Alagoas-Sergipe area, but TO-1A-SE in Sergipe was later reported dry at 8,954 ft. In October four wildcats were drilling in the San Francisco River region, near the Alagoas border, and preparations were being made to start drilling on Itamarica Island, in the State of Pernambuco.

In the South Brazilian area, three wells are drilling, namely MO-1-PR, at Mongolinho, AM-1-MT, at Amambai, and TV-1-SC, at Taquara Verde. The results of some 56 strats are being studied in the Parana basin. In the State of Santa Catarina, signs of oil were found at Taquara Verde, where TV-1 is yielding natural gas. Formation tests were carried out in August at a depth of 6,246 ft, in order to estimate the oil possibilities of a layer of arenite in the Rio Bonito formation. A strong jet of gas, with a bottom pressure of 2,100 psi, remained constant throughout the test.

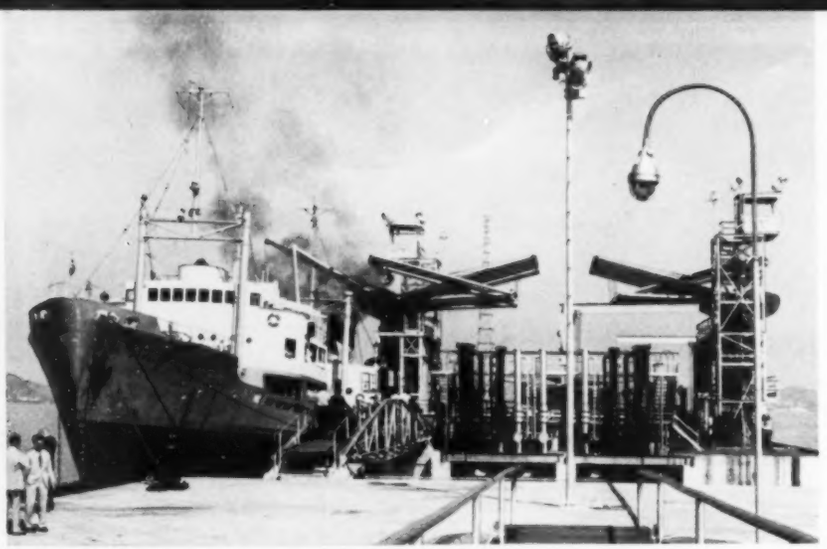
TV-1 is situated 21.6 miles west of Cacador. It is the fourth deep well drilled in Santa Catarina, the others being located at Cacador, Tangara and Lages. The Tangara well, 22.8 miles from Taquara Verde, also showed signs of oil in the same series.

Strats drilled this year at Laranjeiras do Sul, in Parana, and Palmares do Sul, in Rio Grande do Sul, proved dry. In August Petrobras began drilling wildcat AP-1, where oil is expected to be found for the first time in the southern part of Parana. In August, also, prospecting was started near the city of Caceres, in the State of Mato Grosso.

In the Amazon Basin, where 15 rigs were operating in August, the 12th well at Autas-Miriin was abandoned dry at 5,385 ft. Five other wells were then drilling, namely: CDst-1-AC, at Cruzeiro do Sul; RX-3-AM, at Rio Abacaxi; RUst-1-AM, at Rio Aracu; PEst-2-AM, at Rio Preta da Eva, and JUst-1-AM at Rio Jatapu.

Two rigs were recently transferred to Bahia from the Amazon Basin, leaving fifteen still operating in the latter area, which extends from the Acre Territory to the State of Piaui.

In the Bahia Reconcavo a new producing field was discovered at Gomo, where GO-1-BA showed a capacity of some 200 b/d. Wells spudded in this area in 1961 include: SBst-1, at Santa Barbara; FF-1, at Fazenda dos Frades; IB-1 at Ilha Bam-



Major ocean terminal at Guanabara, inaugurated in January, serves the new Duque de Caxias refinery

bura; BG-1 at Boca Grande; DJX-5, an extension of the Dom Joao field. The latter has now 265 producing wells, of which 153 are offshore.

The first results obtained drilling SD-1-BA, the exploratory well at Satiro Dias, in the extreme South of Tucano Bay, seemed to indicate a new petroleum area of considerable importance. On August 24th a fire broke out in wildcat Mapele-2 in Bahia, 2.7 miles north-west of Agua Comprida, Tucano Bay. The well was then 11,375 ft deep and was believed to be one of the most important in the Reconcavo, the first of a new field. In mid-September Petrobras estimated that a further four months would elapse before the fire could be controlled.

The president of Petrobras said recently that of the Bahia fields only Catu can be described as a *bonanza;* 3,150 million cruzeiros are being spent on the development of these fields in 1961, as compared with 2,140 in 1960. Crude production averaged 96,000 b/d during the first six months of 1961 and was raised to 97,000 in July. Of 800 wells in the Bahia Reconcavo between 35 and 40% are not contributing to production, in order to maintain pressure on the active wells.

Domestic consumption in Brazil is now around 260,000 b/d, so that Petrobras supplies about 35% of the demand, while production of derivatives represents 67% of consumption. Although refinery production is increasing it is not keeping pace with consumption, which increased 4.8% in 1959 and 13.7% in 1960. The biggest percentage increases last year were in fuel oil, 15.4, diesel oil, 14.0, gasoline, 12.2 and kerosine 6.1. Meanwhile imports of petroleum products cost Brazil $257 million in 1960, as compared with $253.8 million in 1959.

Rio Belo Horizonte pipe-line: The plan of works has been approved by Petrobras and the aerial and ground survey of the route completed by International Technical Co. (Technit). A section of the Brazilian press continues to criticize this 300-mile pipe-line as uneconomic, in view of the high cost, namely $12 million and 2,000 million cruzeiros, the small volume of products to be carried (25,000 b/d) and the relatively low cost of parallel rail and road transports.

Belo Horizonte Refinery: The plant will be located near Borges, municipality of Santa Luzia on Rio das Velhas, 12 miles from Belo Horizonte. It will have an initial capacity of 25,000 b/d and will boost Brazil's refining capacity to 333,000 b/d by 1963. The plant is also criticized as uneconomic in certain quarters, since the needs of the region to be served can be met for some time to come by the Duque de Caxias refinery near Rio.

Refinery at Porto Alegre: The commission sent to Rio Grande do Sul to select a site has accepted one of several plots offered by the Governor of the state.

San Sebastian Ocean Terminal: To be located on the canal separating the port of San Sebastian from the Island of the same name, near Santos. Plans for the construction have been approved and a temporary organization has been created to carry them out. The project is designed to relieve the congested port of Santos, which handled six million tons of crude, carried by 593 tankers in 1960. The plans include construction and operation of a pipeline, 72 miles long, connecting the terminal to the government's President Bernardes refinery at Cubatao and to the privately-owned Uniao refinery.

Gasoline plant at Bahia: A contract has been signed with Hudson Engineering Corp., for the project and construction of a factory to process 1,400,000 cubic meters of natural gas per day and produce daily 1,510 barrels of propane, 984 bbl of butane and 516 bbl of gasoline. The residual gas will be utilized to maintain the pressure of Reconcavo wells. The cost of the work is estimated at US$3.5 million and, when operating, the factory is expected to effect a saving in exchange of $600,000 monthly.

Synthetic Rubber Factory: Petrobras has signed contracts with Houdry Process Corp., of Philadelphia, in connection with the manufacture of synthetic rubber in Brazil. The contracts provide for the use of patents and construction of the basic unit to produce butadiene at the factory annexed to the Duque de Caxias refinery. Initial capacity of the unit will be 29,000 ton/yr, utilizing the refinery gases. The first phase of construction of the factory, the polymerization unit, was scheduled for completion in 1961 and production of SB-R will start with butadiene imported from the region of the Gulf of Mexico. The cost of installing the butadiene unit is estimated at 3,000 million cruzeiros and local production is estimated to effect a saving of US$7.5 million annually in foreign exchange.

Petrobras has ordered equipment valued at 3,500,000 pounds sterling from British firms for the synthetic rubber factory and for the Guanabara ocean terminal.

Contracts have also been signed with a Brazilian firm, Promon Engenharia S.A., of Sao Paulo for three new units to be installed at the government's Presidente Bernardes refinery to improve the quality of the gasoline, by producing fractions of higher octane indexes, permit production of benzene of a high degree of purity and increase the supply of basic raw materials to the petrochemical industry. Units planned include catalytic reforming, extraction, and naphtha pyrolysis. The cost is estimated at 2,800 million cruzeiros and operation is scheduled to start within 18 months.

Ocean terminal at Ilheus, Bahia. Petrobras announces that work is about to start on an ocean terminal at Ilheus, center of Bahia's cocoa trade and an important producing zone, which has long suffered from an inadequate transport system.

These various investments are boosting the orders for equipment and materials, placed with national industries. The value of such has increased from 1,000 million cruzeiros in 1958 to 3,900 million in 1960 and 4,500 million in the first seven months of 1961. The value of imported materials has consequently declined from US$52 million in 1957 to US$17 million in 1960.

Alteration to Petroleum Regulations: The law obliging Petrobras to indemnify the owners of any area prospected, or exploited, has been held to include the submarine platform, although the latter is federal, not state, property. In accordance with the new ruling, which is made retroactive as from 1957, indemnities amounting to 12,500,000 cruzeiros will be paid to the municipalities of Salvador, San Francisco do Conde and Santo Amaro, in which offshore wells exist.

At the same time the royalty of 5% on the value of oil or gas extracted, including from bituminous schists, payable to the states or territories concerned, has been raised to 8%. From August 1954 to December 1960 Petrobras has paid or credited to the state of Bahia and its municipalities royalties totalling 904,620,550 cruzeiros, of which 723,676,154 pertain to the state and 180,944,401 to the municipalities. The municipalities of Pojuca, Catu and Candeias received the largest amounts, namely: 76.8, 37.0 and 20.4 million, respectively.

END

The fringe of the Gran Chaco, near Puerto Pinasco, Paraguay

Paraguay invites oil help

Oil exploration has been fruitless so far. However, a new oil code with liberal provisions may stimulate interest

by Ricardo Mazo
Director of Minerals, Paraguay

OIL EXPLORATION in Paraguay was first started by Union Oil Co. of California, back in 1946. This company, which had a concession over an expanse of 23 million hectares—the whole of the Chaco area, first carried out a seismic survey and later drilled five holes. Some of these holes showed traces of oil, but nevertheless Union Oil gave up its rights in 1949.

Subsequently, between 1957 and 1959, several foreign concerns were granted oil concessions within the Chaco area of Paraguay, on a contract basis. One of those concerns, a joint venture headed by Pure Oil Co. of Chicago, undertook a widely scattered wildcat operation over an area exceeding 9 million hectares. Pure Oil et al abandoned its concession after drilling four wells and striking two apparently promissory levels of dry gas in the last hole.

Paraguay's new oil law, listed under number 675, was enacted on September 9, 1960. The new law replaced Decree Number 1755, of June 8, 1940, which modified the old mining laws with regards to hydrocarbons.

As is the case in the majority of Latin American oil laws, Paraguay's new legislation states that all hydrocarbon deposits belong to the State. The State has therefore the right to explore, produce, refine, store and transport hydrocarbons, or it may grant such right to private concerns through concessions or contracts subject to the terms and conditions set forth by the law. Such concessions do not give ownership of the deposits, but only the right to explore, exploit, etc., for a definite period. They are considered a real right and may therefore be mortgaged.

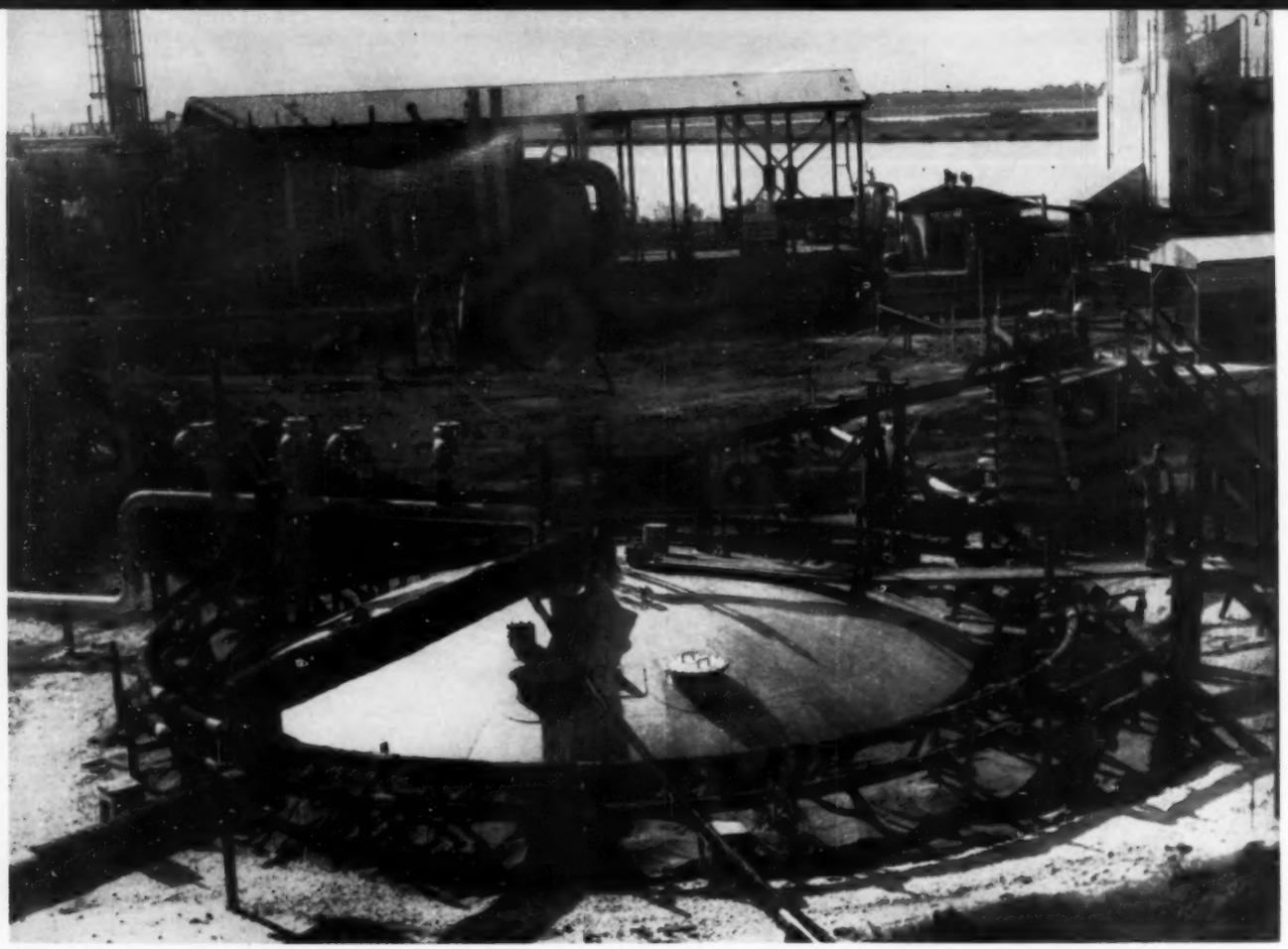
Persons or companies, either Paraguayan or foreign, that are technically and financially competent, may require concessions. In no case, however, not even through intermediaries, may a foreign government or State, or corporations depending upon them, or foreign companies without a Paraguayan domicile, obtain oil concessions. The law states besides that all concessions granted under it shall be subject without restrictions to the laws and courts of Paraguay, and that they can be transferred only with the approval of the Executive Power.

Within areas not already under concession, any reputable concern may request and obtain from the Ministry of Public Works a renewable one-year permit to carry out superficial reconnaissance for oil, including geological and geophysical surveys but excluding drilling. Holders of this kind of permit who may want a priority in the selection of an exploration area within the total area under the permit, shall pay a yearly surface tax of three US cents per hectare. This type of permit is not considered an oil concession of course, but it gives a chance to conduct a thorough preliminary survey without tying up capital money in taxes or patents.

Concessions are granted by the Executive Power, (by means of a decree signed by the

(Continued on page 59)

Chaco nomads live under the trees and shift their homes and herds to take advantage of grazing conditions



Ground storage unit for liquefied gases at Lake Charles, La.

"Mudpie" provides new method for storing liquefied gases

A REVOLUTIONARY, YET SIMPLE, new technique for storing liquefied natural gas in a covered hole in the ground at ultra-low temperatures of —258 F has been introduced by Conch Methane Services Ltd., London, and Constock-Pritchard Liquefaction Corp., Kansas City, in a test demonstration at Lake Charles, La.

The technique involves freezing the ground surrounding the area to be excavated, excavating the hole, and installing a vapor tight sealed aluminum roof over this hole before filling.

Conch has dubbed the method "ground storage" to distinguish it from "underground storage"—storage in caves, caverns and depleted wells. Conch is owned by Continental Oil Co., Shell Petroleum Co. Ltd., and Union Stock Yard and Transit Co.; while Constock-Pritchard is owned 50% by the same three firms and 50% by J. F. Pritchard & Co. an engineering and construction firm.

The test unit at Lake Charles is shown in the accompanying illustrations. Measuring 20 ft in diameter by 20 ft deep, the hole has a capacity to the fill-line of about 900 bbl. The soil at Lake Charles in which the unit was constructed consisted of layers of silt, sand, sandy clay, and clay; and the water level was only 2 ft below the surface.

To prevent cave-ins during excavation and to reduce loss of natural gas during filling, a ring of freeze pipes was sunk into the soil around the area to be excavated, and a refrigerant circulated through these pipes until the soil was frozen for 4 ft both inside and outside the circle of pipes. The surface of the earth in the area of the pipes was thermally insulated during this operation (see photo).

Once the soil was frozen, the excavation took place. Then a thermally insulated roof structure was lowered over the hole and sealed to the earth by a special method, the details of which were not disclosed. Following installation of inlet and discharge lines and a boil-off vent, the unit was ready to receive a charge of liquefied natural gas.

The storage unit was filled to within 2 ft of the top of the hole. Periodically, further liquid gas was added to make up for boil-off which was measured continually.

Three weeks after the initial filling, the isotherms in the surrounding soil were as shown in Fig. 1, and with further passage of time these isotherms gradually moved outwards. It will be noted that the thickness of frozen soil below the hole is less than that around the side walls. This is due to the fact that the pre-freezing oper-

ation was confined to the sides of the hole.

The effect of latent heat in the soil water is reflected in the larger gap between the 0 F isotherm and the 50 F isotherm as compared with the gap between 0 F and the —100 F isotherm. With this type of storage, as the frozen earth barrier increases with time, the thermal insulation improves.

It is, of course, possible to line the hole with thermally insulated material, but such an approach need generally only be temporary because of the growth in the volume of frozen soil. Certain tests with thermal insulation have also been successfully carried out at the Lake Charles unit.

No liquid losses were observed in the unit, and the rate of boil-off decreased with time to about 4% (based on the contents of the storage unit) per day. In a larger unit which would have a greater volume-to-surface area ratio, this figure would be substantially reduced.

In any case, these boil-off figures are within economic limits, since the boil-off can always be used as fuel or recompressed and recycled to the liquefaction plant or sent to the gas pipeline, depending on whether the storage unit is used in connection with a liquefaction plant or a receiving terminal.

No leakage whatsoever was detected, in either the frozen soil or the roof seal.

The Conch method of ground storage is expected to prove cheaper than other techniques for liquefied natural gas storage. It also has an advantage compared with underground storage in that it is more flexible with regard to the sites where it can be used.

Most types of soil examined have been found to have good mechanical properties and sufficiently good thermal insulating properties when frozen. In the case of very dry soils, it may be necessary to impregnate with water before freezing, so as to impart sufficient strength and impermeability to the frozen soil.

The Lake Charles unit was also used successfully to test the pumping of liquefied natural gas by means of a gas lift system, thus avoiding the need for submerged pumps.

Operation "Mudpie" started in late 1960, under the direction of E. Schlumberger, research and development director for Conch, and Dr. C. M. Sliepcevich, consulting chemical engineer with the University of Oklahoma. Dr. Sliepcevich conceived the idea.

Preliminary tests were carried out on behalf of Conch at Shell's Thornton Research Center in England. A hole 5 ft in diameter by 5 ft deep was dug in soft sandstone containing some clay. After pre-cooling with solid carbon dioxide, it provided satisfactory storage for liquid ethylene at atmospheric pressure and —105 C with no signs of leakage. This was followed by tests on a much larger scale at Lake Charles using liquefied natural gas at atmospheric pressure and a temperature of —160 C.

Parallel to these tests, a considerable amount of experimental work has been carried out on the properties of frozen soils, and by means of a computer program the heat losses from insulated and un-insulated holes were calculated. Further computer programs are now calculating the effect of latent heat.

Patents are pending on the ground storage system, the specially designed roof sealing means, and the gas lift system.

Conch has also pioneered research in the liquefied natural gas field, and conducted more than five years of research in the transportation of natural gas in liquefied form at a temperature of —258 F. The first experimental cargo of liquid methane was carried from Lake Charles to Canvey Island near London in February, 1959, by the "Methane Pioneer," a tanker owned jointly by Conch and the Gas Council. This ship has made seven round trips between Lake Charles and London, proving the project technically and economically sound. END

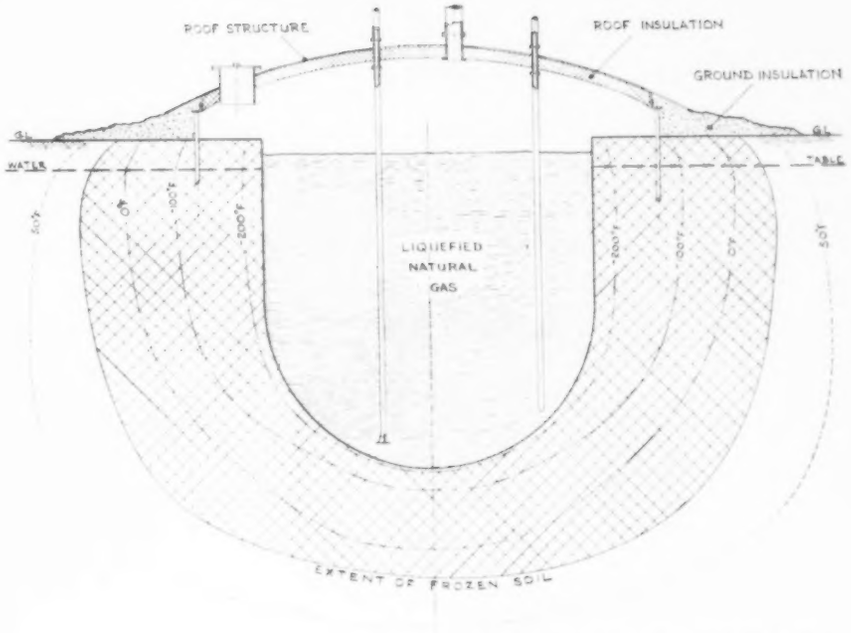


Fig. 1—Cross section of the unit at Lake Charles, showing isotherms three weeks after filling

Excavating the cavity. Thermal insulation covers surrounding earth

Scene of intense construction activity is Port Brega on the Gulf of Sirte where Esso Standard Libya Inc. will complete terminal facilities and a new 8,000 b/d refinery

Libya enters the oil age

LIBYA BECAME AN OIL EXPORTER and a factor to be reckoned with in the world picture on October 25, 1961. On that day the King of Libya, H. M. King Idris I, opened a valve to start the flow of oil to an Esso tanker moored in Port Brega harbor. The event marked seven years of hard labor and many millions of dollars expenditure since Esso Standard Libya, Inc. began operations in Libya.

Jersey Standard flew over a public relations staff and transported nearly a thousand people to the opening ceremonies. M. J. Rathbone, president of the parent company, was present to present a symbolic little gold barrel filled with crude from Zelten field to the King.

In his remarks, Rathbone paid tribute to the Libyan government for its enactment of the Libyan Petroleum Law of 1955 which provided the incentive for private companies to search for oil in the country.

He emphasized the point that forces of normal competition, preferential marketing arrangements and the impact of oil sold in world markets "without regard to the economics of cost or profit", make it difficult to find outlets for major new crude production.

However, he said, "We are glad that Jersey Standard's worldwide operations give us flexibility in finding customers for Libyan crude. We are aided by the remarkable industrial expansion which is taking place throughout Europe." Rathbone also pointed out that the investment needed to transport, refine, and market each barrel of Libya's oil amounts to five times as much as Jersey Standard must invest to produce it.

Looking ahead to the plans of the Esso companies in Libya, R. A. Eeds, president of Esso Libya, said that Esso Libya expects to ship from Port Brega about six million barrels of oil by the end of 1961. This would mean an average daily rate for the balance of the year of 60,000 barrels.

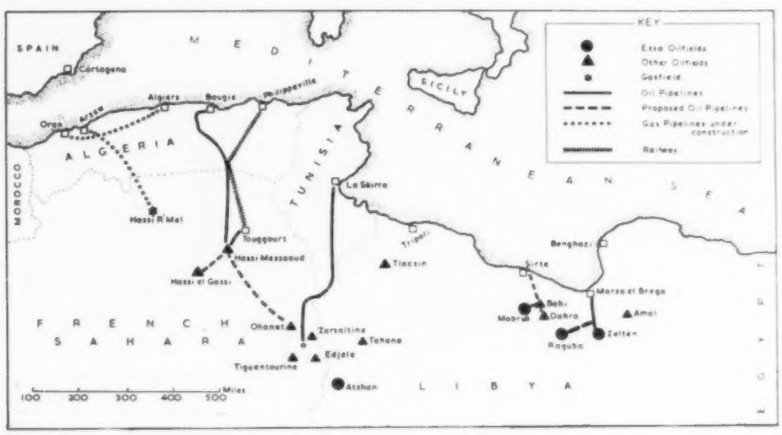
"Before the end of this year, the principal facilities at Port Brega and in the Zelten field will be completed, enabling us to maintain during 1962 an average producing and shipping rate of 125,000 b/d", Eeds said. He also announced that Esso Sirte, Inc., with its partners, Libyan American Oil Co. and W. R. Grace Co., are planning a pipeline outlet from the Raguba field in Concession 20, to be constructed in 1962. It will connect with the Zelten pipeline and it will provide for moving 50,000 barrels of oil daily from Raguba through Port Brega in 1963.

Eeds also announced that Esso Sirte, wholly-owned affiliate of Standard Oil Company (New Jersey), will start construction of an 8,000 b/d refinery at Port Brega. By mid-1963 Libya's internal needs for gasoline, kerosine, diesel oil and fuel oil can be supplied from this source, he said.

Esso Standard Libya, Inc., has constructed a port on about 7,000 acres of dunes and desert at Marsa Brega on the Mediterranean Gulf of Sirte. Port Brega, as the site is now known, is shown in the accompanying illustration.

Included in the port area are: a power generating plant; warehouse; a meter battery capable of tanker loading rates of up to 50,000 b/hr; a jetty built of huge caissons sunk in the sea; a new bow-mooring device located in the sea off Point Brega which can handle tankers up to 77,000 deadweight tons; four huge 268,000 barrel capacity crude oil storage tanks; an asphalt plant to provide material for building roads to oil fields and around the port; product tanks for gasoline, kerosine, diesel fuel and other petroleum products marketed in Libya; and other facilities.

Office buildings, permanent housing for Libyan and expatriate personnel, and the 8,000 b/d capacity refinery are projected for completion in the near future. END



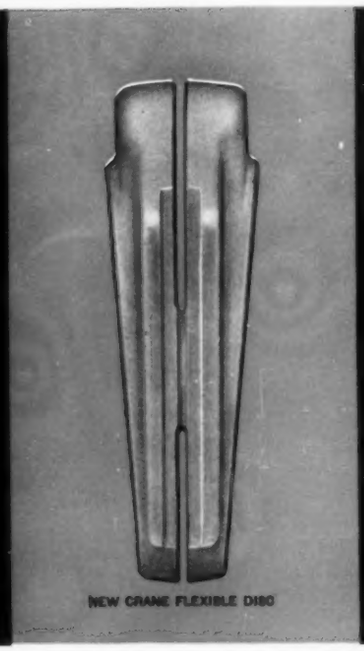
North African oil fields and pipeline facilities. Newly opened Libyan port of Marsa el Brega has placed that country in the world oil picture

ARTIST: TOMI UNGERER

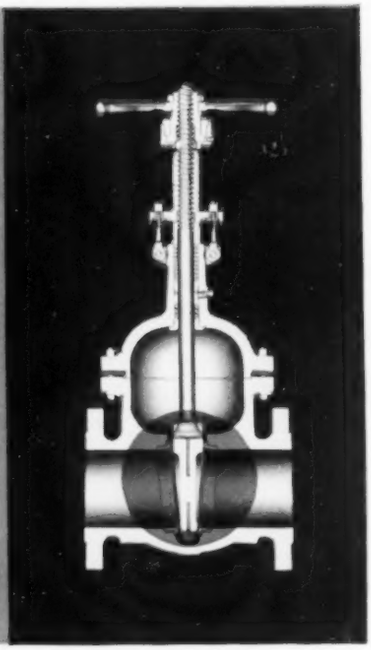
Don't Gamble--Call Schlumberger

PROOF OF QUALITY

Every Crane product is checked for quality at every step of its production. Crane maintains the industry's most complete facilities for engineering, manufacturing and testing its products.



NEW CRANE FLEXIBLE DISC



New CRANE FLEX GATES eliminate sticking in oil operations... operate with less torque . . . outperform any conventional gate valve now in use

Crane Flex Gates are the most significant advance in gate valve design in 25 years! Instead of being made with a solid disc, Flex Gates have separate disc faces that flex slightly when seat faces are joined. This flexibility allows them to conform to the new position and compensates for any minor seat misalignment due to pipeline deflections.

Flex Gates can't stick when closed—even if closed while hot and allowed to cool. They stay tight on both faces over a wide range of pressures. Minimum operating torque is assured for both seating and unseating. Because they're flexible, body seat rings and faces can be serviced economically and quickly.

In some services one Flex Gate does the work of 2 conventional gate valves—saving substantially on piping costs. Extensive field tests show that Crane Flex Gates outperform any conventional solid wedge disc valve now in use.

They are ideally suited for oil, oil vapor, gas, steam or water service. Stem and disc seating faces are Crane Exelloy. Shoulder-type seat rings are Exelloy or Crane No. 49 Nickel Alloy. Where hard facing material for high temperature-pressure service is required, Stellite seat facings can be furnished.

For complete information on this new line of gate valves call your Crane Representative. Crane International makes available to you a complete line of valves from the source most desirable to you—based on price, geographical location and service.

VALVES · ELECTRONIC CONTROLS · PIPING · PLUMBING · HEATING · AIR CONDITIONING

CRANE

INTERNATIONAL

International Headquarters: 300 Park Avenue, New York 22, New York, U.S.A.

MANUFACTURING IN

U.S.A. CANADA ENGLAND FRANCE HOLLAND ITALY

65

Signal Oil & Gas Co.'s Hydeal unit at Houston produces 1,000 b/d of nitration-grade benzene

World's first large Hydeal unit was fast construction project

SOME RECORDS for fast work in the fast-moving petrochemical industry were posted in 1961 when the industry's first large scale Hydeal unit went onstream January 3 at the Houston refinery of Signal Oil and Gas Co. Only 95 days elapsed from ground breaking to the full design capacity production of nitration-grade benzene.

Construction of a complex processing unit in so short a time called for exceptional cooperation among Signal, Universal Oil Products Co., Procon Inc., and the equipment vendors. UOP, co-developer of Hydeal* with Ashland Oil and Refining Co., handled the licensing arrangements. Procon, UOP's construction subsidiary, built the unit.

Despite the obvious problems involved in coordinating the specifying, ordering, and delivery of equipment, the process proved out in two weeks. It has been running well ever since.

There was good reason to hurry. Benzene was in strong demand and toluene was a slow mover with sufficient differential indicated between these two products to make the project worthwhile. Signal contracted to sell the entire output of the still-unbuilt nominal 1,000 b/d unit.

The Hydeal unit was a natural for Signal's Houston operation. Toluene charge stock was readily available from their Udex* unit, while the hydrogen necessary for the hydrodealkylation reaction was obtainable from their 12,500 b/d Platforming* unit.

The process has been described previously in WORLD PETROLEUM (April, 1960, p. 88). It can be applied to a variety of aromatic feedstocks. If toluene becomes too expensive, Signal plans to continue making benzene by going to xylenes and other heavier aromatics. If benzene loses its attraction as a product, the unit can be modified to as to make naphthalene using a different feed.

The unit is shown in the accompanying photographs. It includes heater, reactor, and separator, stripper, and fractionation columns. Hydrogen and toluene are heated in the furnace to reaction tempeerature, and then pass down through the reactor, which contains a fixed bed of catalyst.

Reactor effluent is cooled and sent to a separator where recycle hydrogen is withdrawn. Liquid from the separator flows to a stabilizer, and then to a column for the production of benzene and the separation of toluene for recycle. Charge to the benzene column is clay-treated to permit the benzene product to meet acid wash color specifications.

Miniature electronic instrumentation. The entire processing unit is instrumented almost exclusively with miniature electronics, the first Hydeal unit to use them. Of the 50 instruments, 41 are Minneapolis-Honeywell "Electrik Tel-O-Set" indicators and recorders, and nine are pneumatic Tel-O-Set indicators.

Speed was the by-word throughout the project. Minneapolis-Honeywell, for example, entered the order for the instruments and the control panel on Sept. 27, 1960, and made delivery in the first part of December. Three corporate divisions participated—Fall River, Mass., which produced the electronic indicators, recorders, controllers, transducers, and transmitters; Brown Instruments Division, Philadelphia, which supplied the pneumatic liquid level indicators; and the Special Systems Division in Pottstown, Pa., which fabricated the control panel.

In early November, cases for the recorders and indicator, plus one complete recorder-controller, two transmitters, and two monitor switches were shipped to Pottstown and installed in the panel. The instrument chassis were shipped directly to Signal at Houston, and installed in their cases on the site.

Finding instrument space for the new unit presented a problem. The logical place was in the control room for the Platformer and Udex units, but all panel space was already taken by conventional-sized instruments.

To make room, eleven of the large case instruments were removed from the short leg of a U-shaped panel. Eleven of the remaining instruments were then converted from single-pen recorders to two-pen recorders, and from single controllers to dual controllers wherever it was necessary. At that point, the controls for the Hydeal fit into the control room as if they had been part of the original plan.

All the pneumatic instruments are tape type, liquid level indicators, without control. The 41 Electrik Tel-O-Set instruments handle indication, record, and control of 8 temperatures, 9 pressures, 22 flows, one level, and one specific gravity.

Process variable signals to the pressure recorders are from field-mounted, explosion-proof, pressure-to-current transmitters, with stainless steel Bourdon tube elements. Matching transmitter and recorder ranges are 0-10, 0-100, 0-200, 0-500, and 0-800 psig, and 0-30 psia. Seven pressures are automatically controlled by instruments using electric proportional-plus-reset action.

All seven temperature recorders are also controllers, with proportional-plus-reset-plus-rate control units. The controllers receive their process variable signals from millivolt-to-current transmitters mounted in the control room. Two kinds of thermocouples are being used—Type J (iron constantan) for temperatures up to 1,000 F, and Type K (Chromel Alumel**) for temperatures over 1,000 F.

One cascade control loop. In addition to the seven temperature control loops, there is one cascade loop based on differential temperatures.

The differential temperature instrument is calibrated for a differential of 0-20 F. It receives its input from a millivolt-to-current transmitter with resistance thermometer actuation. Two Brown "A" resistance thermometer bulbs are used as inputs to the transmitter. The bulbs are located several trays apart in the benzene column, and the signal from the differential temperature controller unit resets the control index on a reflux flow controller.

The bulbs are used instead of thermocouples because they produce a relatively large resistance change for a small temperature change, and thus provide better sensitivity for measurement and control in this application.

Fourteen of the 22 flows are controlled by two-mode electric control units. All flow recorders are calibrated 0-10 square root, and all the field-mounted, explosion-proof, bellows-body, differential pressure-to-current transmitters are the same range—0-100 inches of water differential.

The differential pressure-to-current transmitters measure the pressure drop across orifice assemblies in the flow lines and transmit an electric signal in the 4-20 milliampere range back to the panel-mounted flow recorders.

Small explosion-proof precision meters, calibrated 0-10 square root, are used for field indication of flow. One is provided for each flow transmitter at the point of measurement.

For liquid level, ten are indicated and one is controlled. Nine non-control, pneumatic tape-type liquid level indicators receive the standard 3-15 psi pneumatic signal from displacement type "Leveltrol" transmitters.

An Electrik Tel-O-Set circular scale indicating controller also receives its signal from a displacement type Leveltrol pneumatic transmitter after the pneumatic signal is transduced to a 4-20 ma output by a pressure-to-current transducer. It is part of a ratio cascade control loop.

This indicator is the toluene bottoms level controller. The control signal from its proportional-plus-reset control unit resets the control index of the instrument controlling the temperature of the hot oil to the toluene column reboiler.

One Electrik Tel-O-Set instrument records specific gravity in the range from 0.07 to 0.5 on a chart calibrated 0-5. The Ranarex specific gravity transmitter is pneumatic, with a 3-15 psi output. This signal is transduced to the 4-20 ma signal for the electronic recorder.

Final control elements are pneumatic diaphragm valves. Signals from all the electronic controllers are transduced to pneumatic signals by field-mounted current-to-pressure units. These are installed either on the valve bosses or very near the valve so no pneumatic lag is introduced.

The electric instrumentation appears to have been a good choice on the Hydeal unit. For one thing, Signal Oil is working with higher temperatures than in the past, and the speed of response and fast reaction time of the electrics give extra protection against runaway temperatures.

Then too, the control room is not close to the process unit—there is another unit between—and the speed of the electric system has eliminated time lags which might have been troublesome with pneumatic transmissions.

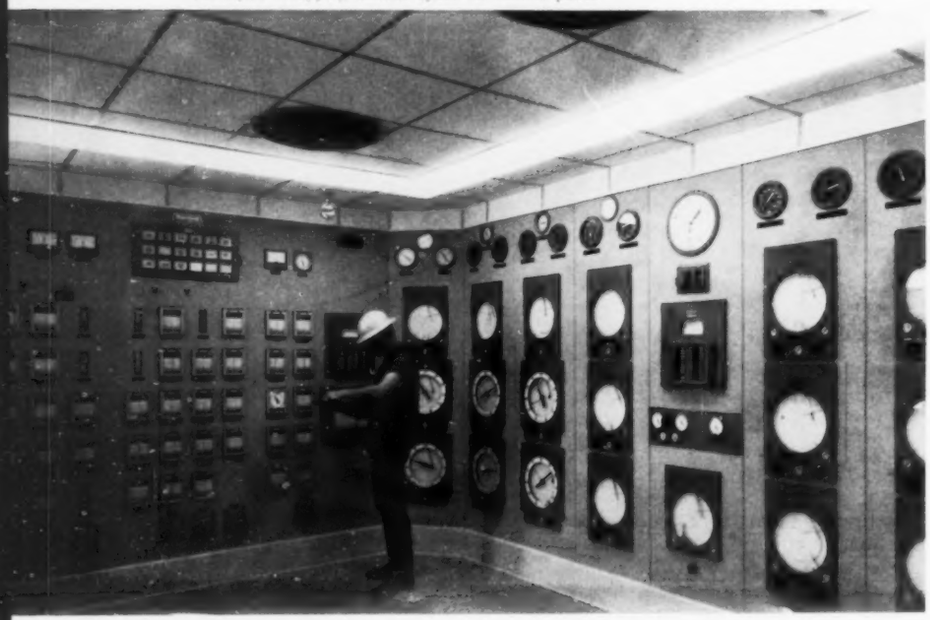
Signal's experience with Hydeal has been good all the way. Barring a major upset in the industry, the unit should pay for itself before the year is out.

Mr. L. J. Davignon, Jr., process control engineer at Houston, says: "This is a nice, sweet unit. We had less trouble with it than any unit we've started up. Design, installation, the operators, and the equipment were all responsible for this success." END

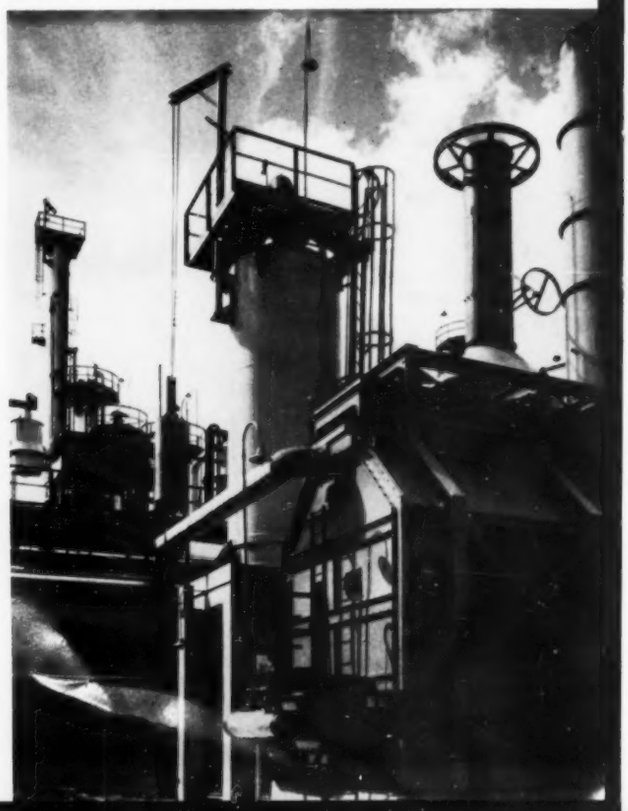
*Registered trademarks of Universal Oil Products Company.

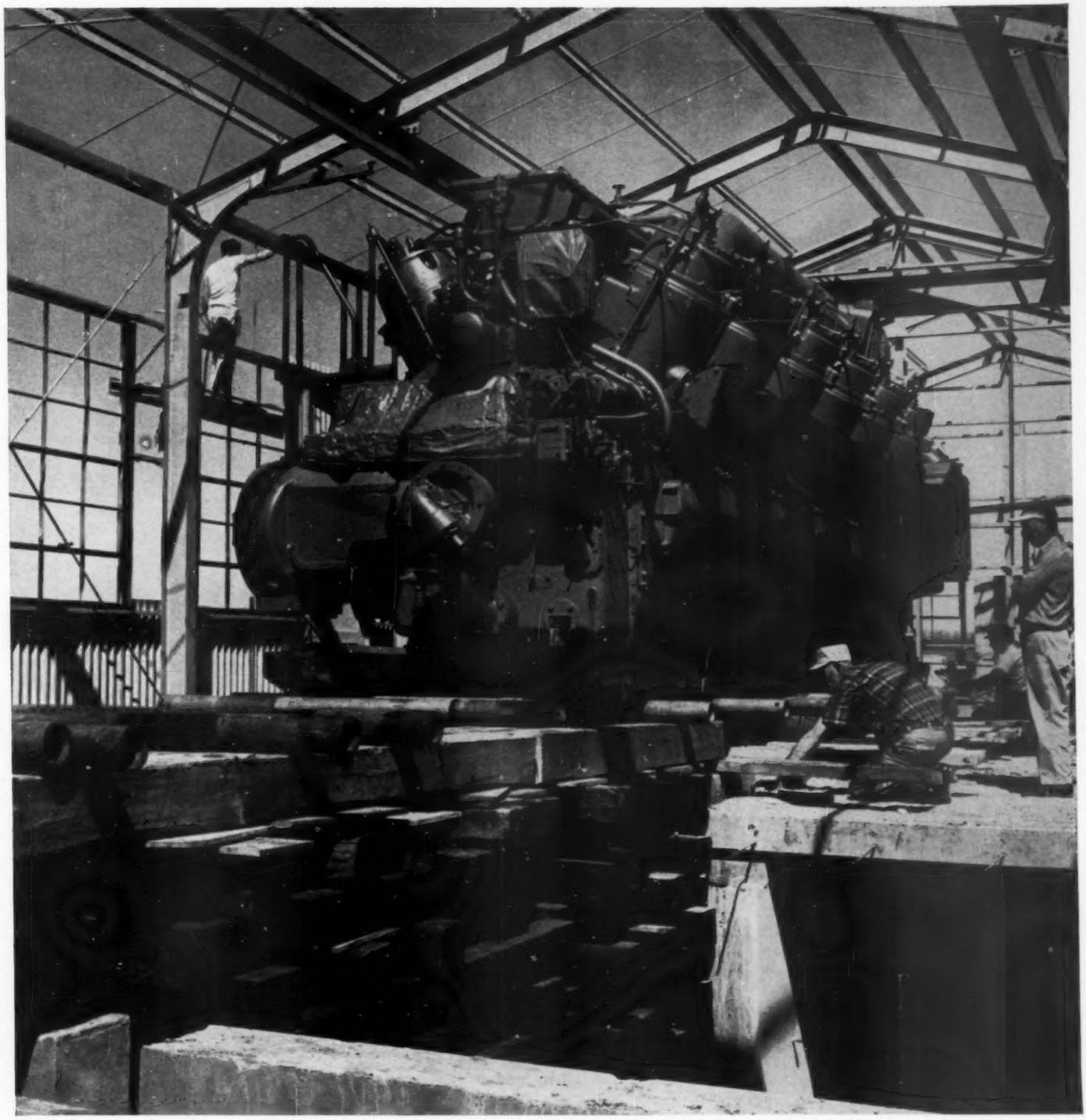
**Registered trademark of Hoskins Mfg. Co.

Most of the instrumentation at Houston is miniature electronic (at left), occupying limited space on control panel



Close-up of reactor and heater sections of the unit





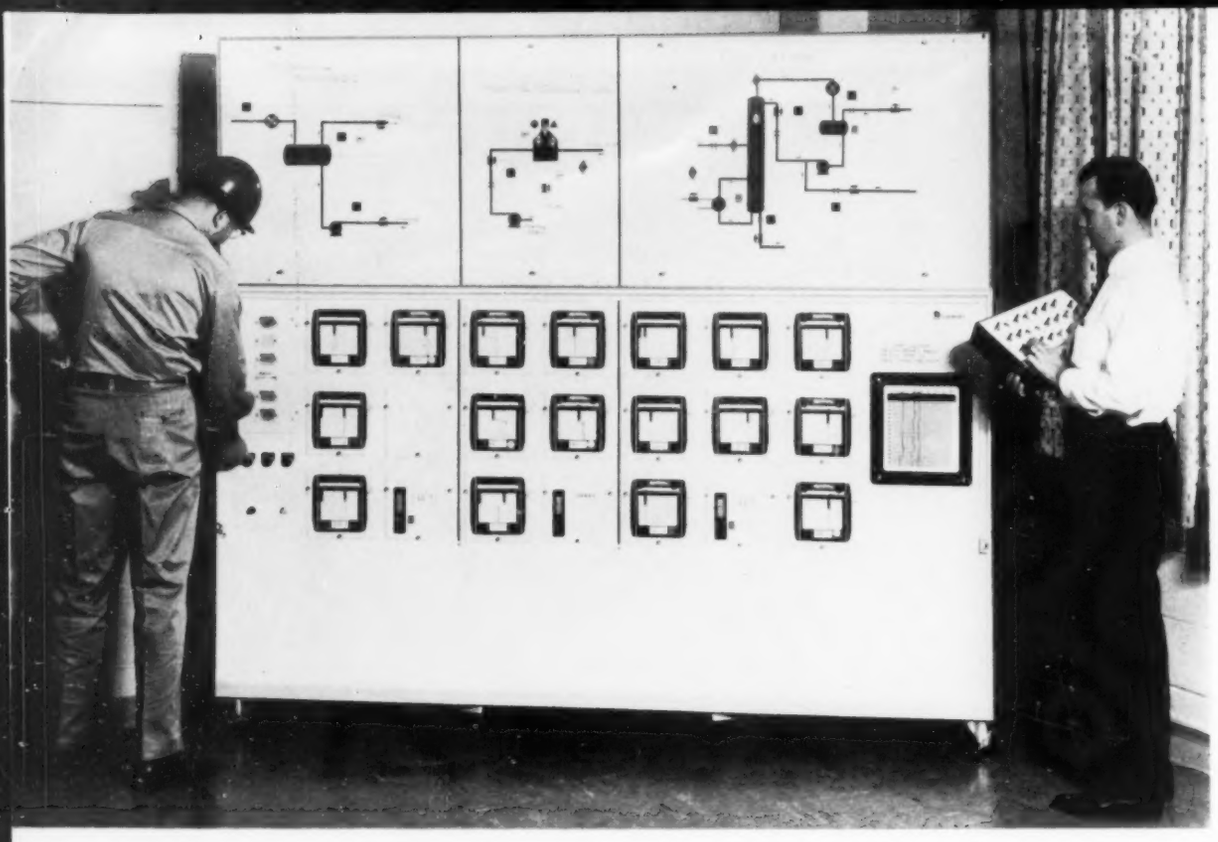
This 74-ton giant is one of many powerful compressor engines being added to Cities Service gas system.

Cities Service on the move

New families, new homes . . . new processes, new products, new plants . . . the demand for natural gas grows and grows. To meet this demand, new pipelines are laid, new storage facilities constructed, new and mightier compressors installed. Every day Cities Service adds to the hundreds of billions of cubic feet of this versatile fuel it supplies to utilities serving American homes and factories.

It is the same story with petroleum and its many products, from asphalts and heating oils to high octane gasolenes and petrochemicals. In every area of its interest, constantly expanding and improving its ability to meet the growing need . . . *Cities Service is on the move!*

CITIES SERVICE



Front panel of training device; instructor holding control console at the right while trainee operates mock-up

Australian refinery operators will use new training device

A NEW, REVISED VERSION of a recently developed and unique training device for process operators will go into service early next year at the two Australian refineries of Standard Vacuum Oil Co.

Two training units will be used, one at the 43,000 b/d refinery at Altona, and the other at the new 37,800 b/d plant being constructed at Port Noarlunga, near Adelaide. They are identical models, and are based on the same principle as that of the previous units, by which the trainee "learns by guided doing." Carmody Corp., designers of the devices and developers of this system, have referred to it as "corporal" training; in that it teaches the employee through actual performance on a mock-up of the control panel of a process unit. In other words, both his mind and his body are involved in the learning process.

In essence, the system embodies the concept involved in training devices for aircraft pilots, in which the trainee "flies" in a replica of an actual cockpit against simulated flight conditions, yet stays on the ground with no possibility of loss of life or equipment. The Carmody approach substitutes a control panel mock-up for the cockpit and a process trainee for the pilot. The instructor follows a specific program of regulating the actions on the training panel to simulate actual process conditions, including start-up, normal and emergency shutdowns, upsets, and the like.

The point of difference in the new version is that it is a "Universal" trainer, providing a wide range of adaptability to various processes. The other models had been designed primarily for specific equipment — fractionators, cat crackers, and smaller components such as furnace burners, control valves, etc. The earlier design has already been described in WORLD PETROLEUM ("Unique Trainers to Aid Refiners," April, 1961, p. 66).

Both types of trainers have specific advantages, depending upon the aims and needs of the training program. For example, Esso Standard Oil S.A. plans to use Carmody unit trainers rather than the universal design for the new refineries to be built in the Caribbean area.

Stanvac will use one of the new devices for start-up training at Adelaide and the other for continuous operator training at Altona. Several different process operations will be covered in the start-up program; including crude still, vacuum still, catalytic reforming, hydro-desulfurization, sulfur dioxide extraction, and sulfur recovery.

Consisting basically of two panels, the new trainer is illustrated in the accompanying photographs. A lower panel contains 21 stations for modular, plug-in, electrically operated and controlled, simulated instruments; plus six visual and audio alarm stations, and various control switches. Sets of interchangeable charts and scales are provided for each instrument.

The upper panel has a light green, magnetic ceramic surface for grease pencilling in the flow diagram, for attaching magnetized symbols, for displaying small trainers containing component details, or for the instructor's use in making "chalk talks."

At the rear of the trainer cabinet are the actuating electrical and mechanical components. This also contains the patchboard

for programming the action by means of jumper wires. With 214 contact points and 110 jumper wires, the possible permutations and combinations are virtually infinite. Capability is also provided for interlocking instruments so that, for example, an indication of rising temperature on one instrument will automatically bring about a rise in pressure in another. Patchboards which have been set up for given simulations may be removed (with jumper wires in place), and stored for future use.

To control the training device, the instructor uses a remote console that is connected by an extension cord to the trainer. With this hand console, he can manipulate the various instruments and alarms, and thus simulate the actual dynamics of the process. The trainee, standing at the control panel, must then take the proper steps to meet the situation.

When extended for use, the trainer measures 8 ft long, 7 ft high, and 16 inches deep. Folded for shipment, it makes a package 8 ft by 4½ ft by 16 inches. It weighs 450 lbs. The instructor's console, which has silent switches, can be operated at up to 20 ft from the trainer. Input electric power is normally 110-120 volts, 50-60 cycle, single phase.

The simulated instruments on the panel include nine recorder-controllers, nine recorders, three ribbon-type indicators, and a multi-point recorder with three pens. Plexiglas faces over all but the three indicators permit trends to be grease pencilled over the charts. There is sufficient storage space in the rear of the cabinet for unneeded instruments and other accessories.

Payoff in anticipated savings in the use of the trainer will come in two ways:

(1) A direct payout in terms of less costly training programs. Depending upon the background, aptitude, and experience of trainees, a significant amount of the training time can be saved.

(2) An indirect, somewhat less tangible saving in the insurance against expensive operator mistakes when running an actual process unit. The elimination of just one serious operator error might pay for an entire program as well as the training device.

A wide variety of uses have been developed in studies of the trainer by oil company representatives and the Carmody Corp. engineers. Among them are:

(1) Training new operators on existing processes.

(2) Training experienced operators on new processes.

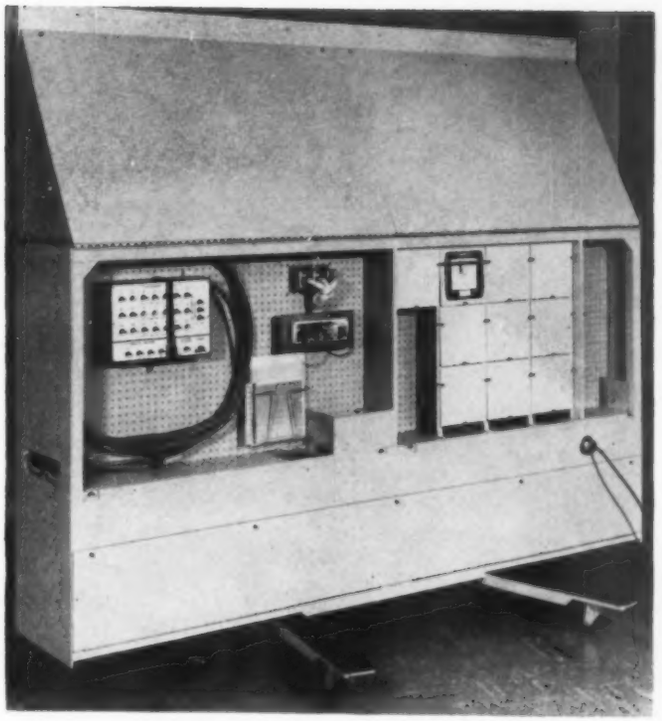
(3) Providing refresher and proficiency training.

(4) Establishing standards of performance which will help achieve higher process efficiencies.

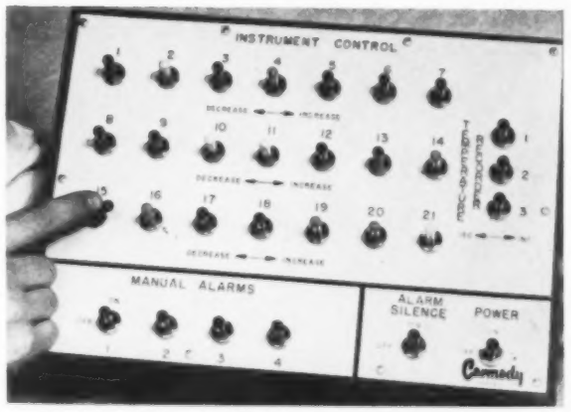
(5) Reviewing process upsets, and rooting out their causes.

(6) Teaching, and emphasizing, safe practices.

(7) Providing a means for operator self-improvement. The trainer can be placed in a control room and used during slack periods.



Rear of trainer cabinet. Instructor's console is stored at left; extra instruments at right. Program patchboard is at lower center



Close-up view of the instructor's control console; switches are silent type

(8) Assisting in the design of new instrument control panels before they are installed, including both general layout and specific instrument requirements.

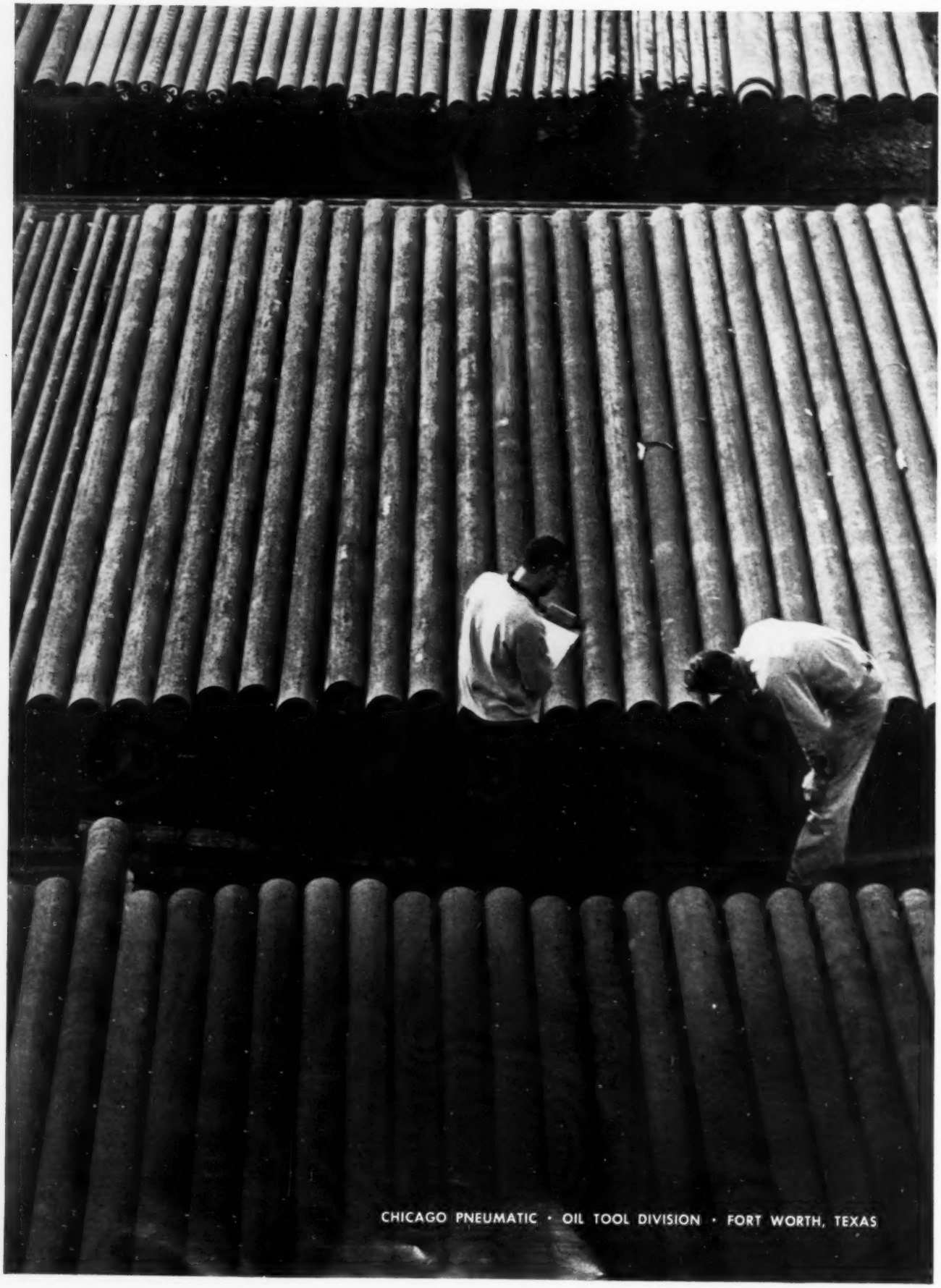
(9) Developing self-confidence in the operator.

(10) Assisting in overcoming language barriers, which is of especial interest to companies operating in non-English speaking areas. Items of equipment shown visually on the panel can easily be labelled with the grease pencil in both English and the language of the particular locality.

An interesting result in the use of the trainer has been the strong effect of role playing on the trainee. In going through a session with the instructor, the trainee finds himself regarding any given situation as very real; he actually sweats out an emergency until he has solved it and returned the unit to normal operating conditions.

The new Universal trainer is more expensive than some of the unit type trainers; about $18,000 compared with some $14,000 for the original TCC unit trainer. However, it has extreme versatility, being capable of handling training on everything from a simple fractionating column to an alkylation unit.

As each new trainer is developed and built, the oil company and the manufacturer work together in the development of instructional programs to be used with the device. Also, in the case of the two trainers for Stanvac's Australian refineries, key personnel are going through a short course at the manufacturer's plant to become familiar with the equipment. END



CHICAGO PNEUMATIC · OIL TOOL DIVISION · FORT WORTH, TEXAS

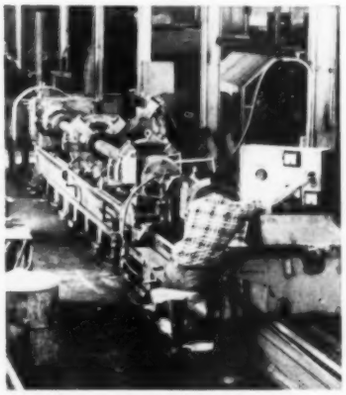
DRILL COLLARS IN THE "RAW"

These CP Drill Collar blanks started with an exact metallurgical analysis . . . were then heat treated to develop the ideal characteristics of strength and wear resistance precisely right for your needs.

You can't buy a better Drill Collar than CP. Precision bored on our own trepanning machines they are "perfect in every detail" . . . thread form . . . wall thickness . . . balance . . . metallurgy.

Insist on CP Drill Collars, they'll provide the weight and give your string the true-running qualities that make holes faster. And they'll be delivered right on schedule.

At CP we know that you've "no time for downtime."



WE HAVE EXPERT DRILLERS, TOO . . . their job is making hole in chrome steel. They drill horizontally and the rig is a trepanning machine of our own design!

Chicago Pneumatic
FORT WORTH, TEXAS

BITS • DRILL COLLARS
REAMERS • TOOL JOINTS

Paraguay Invites Oil Help

(*Continued from page 47*)

President and all of the cabinet members); for the following: a) exploration and subsequent production of oil within a given area; b) direct production of a definite area; c) refining and processing of oil; and, d) transportation by pipelines or other means, as well as storage.

An exploration concession gives the exclusive right to explore for a four-year term (extendable up to two two-year periods) within a maximum area of 1.2 million hectares, parcelled in lots of 40 thousand hectares (about 99 thousand acres). The holder of this type of concession may select and obtain at any time one or more exploitation lots within the original area, but in no case can these lots exceed 50% of the area of the exploration lot where oil was found.

As guaranty of fulfillment of its obligations, the party requesting a concession shall deposit in a bank account designated by the Ministry of Public Works, 10 US cents per hectare, or an acceptable bond for the equivalent amount. This guaranty is refundable and is held only as long as the concession is active.

The amount to be invested in exploration activities shall be not less than 25 US cents per hectare per year, with a limited minimum of $200,000 per year.

Exploitation or production concessions shall have a minimum area of 2,000 hectares and a maximum of 5,000, and they will be granted for a term of up to 40 years. When the production period of a concession starts, the company shall carry out the following program: during the first seven years, it shall drill one or more holes totalling up to a minimum of 5 thousand meters per every 100,000 hectares; during the following 3 years all of the selected lots shall be in commercial production.

The refining, transportation and storage of oil is a subsidiary right of a concession holder, who may exercise it once he has presented a financial and technical layout of the proposed operation, and such layout has been approved by the Ministry of Public Works. But any other private concern may request and obtain such concessions also, following the procedures outlined above. In this case the concessions will be granted for a 40-year period, while a subsidiary concession for refining, etc. shall last as long as the exploitation concession. Under no circumstances the holder of these kinds of concessions shall be compelled to build additional installations to take care of oil produced by other companies or by the State.

Superficial concessions shall pay a patent (surface tax) of three US cents per hectare per year. This patent will be doubled if the original four-year term is extended.

During the production period, concessions shall pay an initial patent of 30 US cents per hectare. Then there is a yearly patent per hectare according to the following schedule:

10 US cents from the 1st to the 5th year.

30 US cents from the 6th to the 10th year.

80 US cents from the 11th to the 15th year.

$1.00 US from the 16th to the 20th year.

80 US cents from the 21st to the 30th year.

50 US cents from the 30th to the 40th year.

In addition, the State shall receive a royalty of 10% of the crude on a production of up to 5,000 b/d (barrels daily); 12% on over 5,000 b/d and up to 10,000; and 15% on a production of over 10,000 b/d. The royalty to be received by the State on dry gas and asphalt is of 12% and 15%, respectively.

Prospection and exploration expenses within the national territory, unproductive holes and other intangible expenses can be deducted as operation expenses for income tax purposes. A depletion allowance of 27% of the gross value of oil production is also permitted. This allowance is limited to 50% of the net profit shown by the annual balance of the company.

Equipment and machinery for all phases of oil exploration, production and industry can be introduced into the country free from taxes and duties. Oil, its derivatives and its transportation are also free from fiscal or municipal taxes, and from any export duties during the first 35 years.

Other aspects of the law, like those regarding temporal land tenure for instance, are also liberal in their terms; and the whole mechanism of the law is simplified by the fact that in most cases all concessions problems can be dealt through one agency of the Government, namely the Direccion de Produccion Mineral, within the Ministry of Public Works in Asuncion, Paraguay.

END

NOMAD Visitors to New York

International and West Coast visitors to the October meeting of the New York Chapter of NOMADS were: Seated (left to right); Ted Sutter, Baker Oil Tools, Inc., Los Angeles, Calif., Morad Behbehani, Consultant, San Francisco, Calif., R. N. Waters, Baker Oil Tools, Inc., Los Angeles, Calif., William Troxler, Richmond Petroleum Co., Maracaibo, Venezuela, Paul Bunke, American Overseas Petroleum Ltd., Turkey, Karl L. Kellogg, Kellogg Overseas Corp., Long Beach, Calif., and Standing (left to right); P. R. Hassan, Arabian American Oil Co., Saudi Arabia; Forrest Kellogg, Kellogg Overseas Corp., Long Beach, Calif.; Tom Walsh, International Petroleum Co., Colombia; Edward Bourne, Mene Grande Oil Co., Venezuela; Alvaro Umana V., Fred W. Schumacher Co., Ltd., Costa Rica.

Desalting Processes

Petreco division of Petrolite Corp. has announced the availability of a new 16-page brochure on desalting processes and equipment for petroleum refiners. Supplemented with photographs, photomicrographs, charts, graphs and drawings, the booklet fully describes the processes and equipment of Petreco electric desalting and TRET-O-LITE chemical desalting.

For further information or for a free copy of the booklet, write to Petreco division of Petrolite Corp., 3202 South Wayside, Houston 1, Texas, or to Petroleum Rectifying Co. of California, 1390 East Burnett Street, Long Beach 7, California.

Here is the answer to pump problems on your drilling rigs. The *all new Gardner-Denver KX Series Mud Pumps* incorporate in their design, the very features that you need for increased performance, reliability and ease of maintenance. For instance, to save time in up-keep, every part has been arranged so that it is readily available without special tools or removing other unrelated parts. Your crew can change pistons and rods without opening the power end. Liners and packing worries are *ended* with new metal to metal liner construction. One piece connecting rods eliminate bolt failures. Valve cover plates are of the threaded type that saves time on valve inspection and replacement.

In addition to all of these outstanding features you will find many more, such as improved lubrication from two oil pumps, larger bearings, crown-shaved helical gears. But features alone won't tell the whole story . . . The *KX* Series have actually been designed from the skid up from the very best information on pump performance as reported by you, the contractor . . . from suggestions by our skilled field personnel . . . and latest engineering and metallurgical findings of our pump men.

Available in two models, *KXF*, 700 horsepower and *KXG*, 1,000 horsepower, these new Gardner-Denver pumps contain more "field important" features than any other pumps we have ever seen built for the drilling industry. Now field proved by more than two years of drilling service, they are ready to go to work for you.

GARDNER-DENVER

KX MUD PUMPS

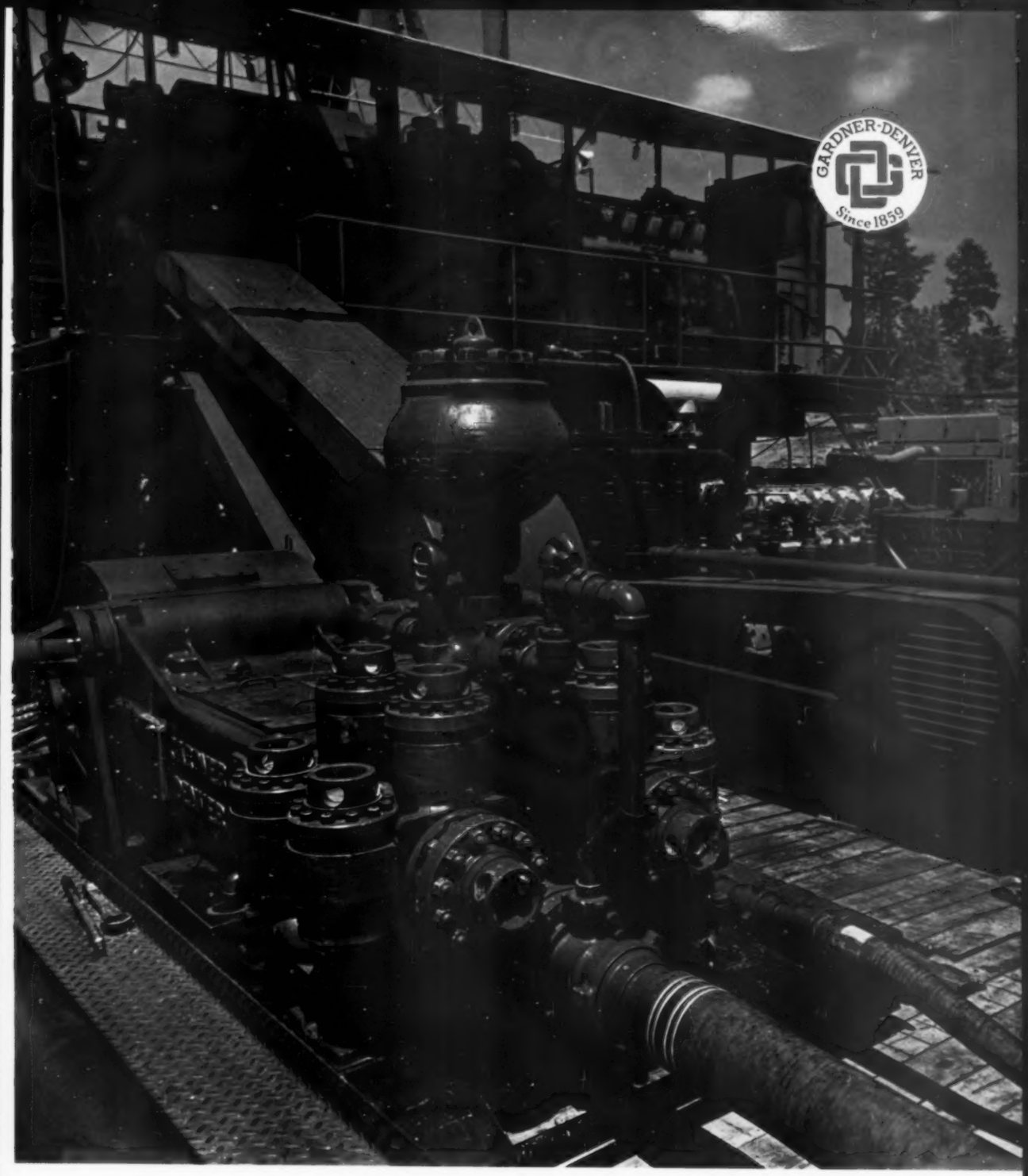
KX SERIES

MORE PERFORMANCE

MORE EASILY MAINTAINED

MORE RELIABLE

Please turn page



GARDNER-DENVER KX SERIES MUD PUMPS

Development of the Gardner-Denver KX Series Mud Pumps is one of the most important steps taken in many years toward faster, more economical drilling. New from the skid up — they are the engineered result of what you, the user, and our pump service specialists have asked for in the design of the finest mud pumps in the oil field. ☐ Ask your Gardner-Denver representative for the full story on the KX series mud pumps or write direct for complete information.

©1961 Gardner-Denver Company, Quincy, Illinois

Printed in U.S.A.

GARDNER-DENVER

KX SERIES

SERIES MUD PUMPS...
...TEAMED WITH
GARDNER-DENVER
DRAWWORKS FOR FASTER
DRILLING.

Gardner-Denver KX series mud pumps are matched to the advanced engineered series Gardner-Denver Drawworks – 2100 – 1500 – 1100

Full line manufacturing of every major item from crown to mud pumps enables Gardner-Denver to offer you equipment that has been expressly designed to "work together" as a balanced team to reduce costs of drilling, moving and maintenance. For every drawworks there is a compound, swivel, block, rotary table, mud pump and compressor to match drilling programs.

For the Gardner-Denver "Advanced Engineered" series of deep well drawworks, Gardner-Denver has developed the *KX* 1,000 and *KX* 700 horsepower duplex mud pumps. They match the Gardner-Denver 2100 drawworks when drilling from 15,000 feet on down, the Gardner-Denver 1500 drawworks where drilling programs are in the 10,000 to 20,000 foot range and the Gardner-Denver 1100 where drilling requirements start at 8,000 feet and go down to 15,000 feet.

These matched drawworks to the *KX* series of mud pumps offer unequalled new designs that reflect Gardner-Denver's years of accumulated know-how in building heavy equipment. This is demonstrated in the short shaft and large bearing arrangement of the transmission and drawworks and in the carefully ratioed sprockets and chains. All these features reduce loading of individual components, extend service life and reduce maintenance.

Consider your next drawworks as a "Balanced Team" that, designed to work together, will give exceptional operating performance . . . then call in your Gardner-Denver man and let him show you how Gardner-Denver matched equipment will work faster, cost less to operate and produce more profit per rig dollar. Write or call today for the full story on the only completely new "full line" of equipment in the oil patch.

U. S. A. Gardner-Denver Company, Quincy, Illinois. Offices in principal U. S., Canadian and Mexican cities. Petroleum Products: Dallas, Texas. **CANADA** Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario. **INTERNATIONAL** Gardner-Denver International Division, 233 Broadway, New York 7, New York. Offices: Buenos Aires, Argentina; Artarmon, N. S. W., Australia; Brussels, Belgium; Rio de Janeiro, Brazil; Santiago, Chile; Barranquilla, Colombia; Lima, Peru; Ndola, N. Rhodesia; Salisbury, S. Rhodesia; Johannesburg, Transvaal.

Gardner-Denver equipment combines imaginative engineering and modern technology with a century of experience.

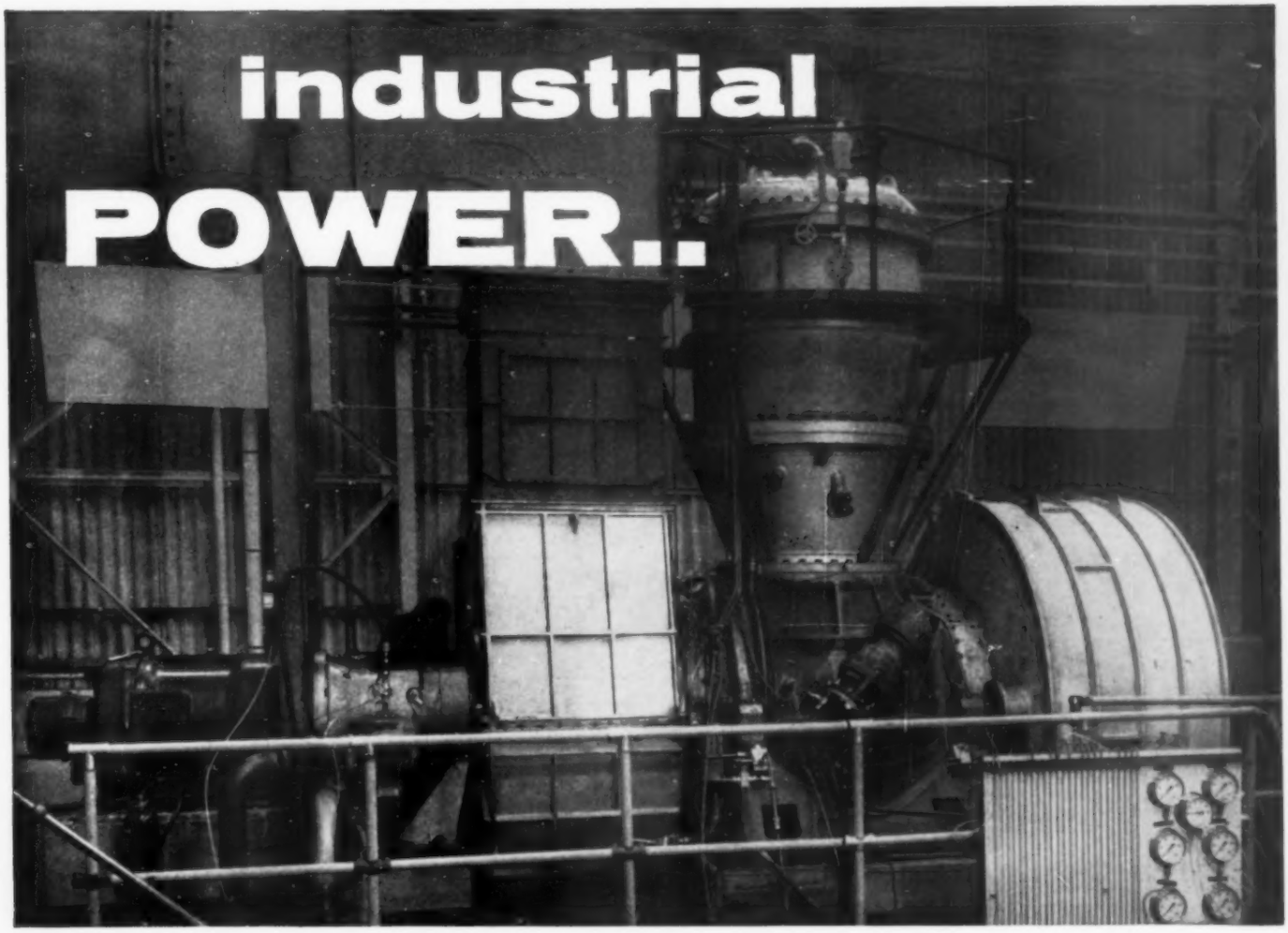
GARDNER-DENVER Since 1859 — 1 CENTURY

1100
Gardner-Denver Drawworks
8,000' to 15,000'—1100 H.P.

150Q
Gardner-Denver Drawworks
10,000' to 20,000'—1500 H.P.

2100
Gardner-Denver Drawworks
15,000' on down—2100 H.P.

COMPACT



An 'ENGLISH ELECTRIC' EM85 gas turbine undergoing works test. This is one of seven units being supplied to the Iraq and Basrah Petroleum Companies for pump drives.

'ENGLISH ELECTRIC'

industrial gas turbines

The 8,000/9,000 h.p. 'ENGLISH ELECTRIC' EM85 gas turbine—only 21 ft. long—is, for this power, one of the most compact two-shaft industrial units available. This multi-purpose turbine, operating efficiently over a wide range of output speeds, has an attractive fuel consumption and embodies experience gained with earlier designs ranging from 3,000 h.p. to 28,000 h.p. The exceptionally small size of the EM85 and the absence of reciprocating parts keep building and foundation costs low.

For technical details, send for Publication GT.104: The ENGLISH ELECTRIC Company Limited, Gas Turbine Division, Whetstone, Leicestershire.

THE ENGLISH ELECTRIC COMPANY LIMITED, ENGLISH ELECTRIC HOUSE, STRAND, LONDON, W.C.2

Offices and representatives throughout the world

GT.8

OIL COMPANY STAFF CHANGES

A. L. Nickerson

F. W. Bartlett

ALBERT L. NICKERSON has been elected chairman of the board of Socony Mobil Oil Co. Inc., succeeding **FRED W. BARTLETT,** who has retired as a director and chairman of the company. Nickerson has been president of Socony Mobil since 1955 and chief executive officer since 1958. He will continue as chief executive officer. **HERBERT WILLETTS** was elected president of Socony Mobil. For the past two and a half years. Willetts has been an executive vice president of Socony Mobil and president of its Mobil Oil Co. division, which conducts all of Socony Mobil's operations in the United States and Canada.

Herbert Willetts

F. H. Moore

He was elected a director of Socony in 1951 and a vice president in 1953. **FRED H. MOORE** was elected a member of the board of directors and an executive vice president of Socony Mobil. In addition, he will succeed Willetts as president of the Mobil Oil Co. division. Moore is now executive vice president of the Mobil Oil Co.

J. P. LUNDE has been elected a vice president of Aramco Overseas Co. Lunde, formerly of Dhahran, has been on an extended assignment with Socony Mobil Oil Co. in the United States.

CHAS. A. PERLITZ, Jr., executive vice president of Continental Oil Co., has been elected chairman of the board of directors of Hudson's Bay Oil and Gas Co., Ltd., Calgary and **J. R. MURRAY,** Winnipeg, managing director of the Hudson's Bay Co., has been elected vice chairman. Perlitz succeeds **L. F. McCOLLUM,** president of Continental, who continues as a director of Hudson's Bay Oil and Gas. Murray was elected to the vacant vice chairman position on the company board. **M. B. MORRIS,** general manager of the exploration department, has been appointed a vice president of Hudson's Bay Oil and Gas.

GARTH L. YOUNG, who continues as vice president in charge of foreign operations for Signal Oil and Gas Co., has been elected president of Iricon Agency Ltd. He succeeds **E. M. BENSON, Jr.,** manager of land and lease division for Richfield Oil Corp.

J. R. H. van SCHAIK has been appointed area co-ordinator, Oil, North Europe, in succession to **H. C. CARRAD,** who is retiring. **N. M. L. WATSON** has recently been acting as area co-ordinator, Oil, North Europe.

Continental Oil Co. has announced the appointment of five men to direct international exploration activities in newly designated areas. **J. F. TOLLESON,** Paris representative, appointed area manager, Europe and the French Community, with **D. B. EICHER,** formerly staff geologist at Houston, Texas, becoming area exploration manager. **J. R. STRONG,** New York, senior staff geophysicist, appointed area exploration manager, Africa. **J. F. MASON,** New York, staff geologist, appointed area exploration manager, Western Hemisphere.

P. E. Owens

P. W. Rishell

PAUL E. OWENS has been elected president and chief executive officer of Macmillan Ring-Free Oil Co., Inc., and **PAUL W. RISHELL,** has been elected executive vice president and treasurer. Both men were also elected to the Board of Directors. Owens came from American Independent Oil Co. where he was vice president of marketing, world-wide. Rishell has had 14 years of diversified financial experience with Standard Oil Co. (New Jersey) and affiliated companies.

SAM B. OLDEN, inter-governmental affairs advisor for Socony Mobil Oil Co. has been appointed general manager of Mobil Producing Tunisia.

H. BRIDGES has been appointed by Royal Dutch/-Shell, Regional Co-ordinator, Oil, Caribbean, Central and South America, in succession to **W. F. G. L. STARRENBURG,** who will take up the post of Director of Co-ordination, Chemical, at the beginning of next year. **W. F. MITCHELL,** at present Director of Co-ordination, Chemical, is to become executive vice president, Shell Oil Co. of Canada Ltd.

RAYMOND J. PIKNA has been made factory manager of The Firestone Tire & Rubber Co.'s new synthetic rubber plant at Port Jerome, France. **CHARLES H. HAMMOND** became production manager of the plant.

J. NORMAN BAXENDALE, formerly regional drilling superintendent of the Mid-Continent and Rocky Mountain region, has become the assistant manager of foreign operations for Kerr-McGee Oil Industries, Inc.

B. SCHEFFER has been appointed, general manager of Deutsche Shell A.G., in succession to **H. van DRIMMELEN,** O.B.E., who has retired.

ARCHIE D. GRAY, senior vice president of Gulf Oil Corp., has retired. His resignation follows a 26-year association with the corporation. Gray joined Gulf's law department in Houston as a trial attorney in 1935 and he was elected a vice president in 1957 and a senior vice president in 1958.

Admiral Burke

J. I. Mingay

ADMIRAL ARLEIGH BURKE, U.S. Navy (Ret.), has been elected member of the Board and of the Executive Committee of Texaco Inc.

Arleigh Burke, who retired as chief of Naval Operations on August 1, 1961, after 42 years of service in the Navy, was graduated from the U.S. Naval Academy in Annapolis in June, 1923. During World War II, Burke commanded several destroyer divisions, and because he pushed his ships just under boiler-bursting speed he became widely known as "31-Knot Burke." In August, 1955, he was named chief of Naval Operations and member of the Joint Chiefs of Staff. In serving three terms as CNO, he served longer as a chief of service than any other officer in the history of the United States.

T. C. Barger

P. H. Arnot

NORMAN HARDY retired as chairman of the Board of Arabian American Oil Co. and president **THOMAS C. BARGER** became chief executive officer December 1. **R. I. BROUGHAM** and **PAUL H. ARNOT** have been designated senior vice presidents, newly created positions. The board also announced the resignation of **J. H. McDONALD** as vice president, secretary and director of Aramco. He will retire at year end. **J. J. JOHNSTON** was elected a director and secretary of Aramco and succeeds McDonald as general manager, USA offices. **R. M. HENRY** has been elected assistant secretary and succeeds Johnston as assistant general manager, USA offices.

R. I. Brougham

J. J. Johnston

LORNE A. SMITH named general manager of International Petroleum's Peruvian operations, succeeding **JACK ASHWORTH,** who has resigned to accept a position with a group of British bankers having substantial interests in Latin America.

A. W. Baucum

M. J. Epley, Jr.

Texaco Inc. has announced five executive changes. **ARCH W. BAUCUM** and **MARION J. EPLEY, Jr.,** have been elected to the newly-created positions of executive president. **JOHN W. GREEN,** vice president, domestic sales, has become senior vice president in charge of world-wide marketing, succeeding Epley, and **HOMER O. WOODRUFF,** general manager, domestic producing, has succeeded Baucum as vice president in charge of that department. **JOHN I. MINGAY,** formerly general manager, domestic sales, has succeeded Green.

J. W. Green

H. O. Woodruff

ROBERT G. CAPELL has been appointed director of commercial development in the petrochemicals department of Gulf Oil Corp. headquarters succeeding **VINCENT N. HURD,** recently appointed manager of the petrochemicals department of Gulf Eastern Co. in London.

(Continued on page 66)

Shamals by Synoptics*...

THE SHAMAL WINDS – violently unpredictable – could spell sudden disaster for this mobile drilling platform in harbour at Das Island, in the brief, critical period of being moved at sea. But now the bogey of these ancient waters has been countered – by modern meteorology. *Adma Enterprise* with its drilling rig (owned and operated by BP in association with French interests) waits in berth till synoptic weather reports are assembled from the new network of weather stations in Iran, Kuwait and South-East Arabia. It will proceed only when the "all clear" is given. British Petroleum has taken a leading part in organising these Weather Reporting Stations. Thus drilling and pipe-laying operations, as well as shipping, now proceed more securely in these deceptive waters.

BP

* "*Synoptic meteorology is a weather reporting technique based upon the collation and comparison of simultaneous reports from different areas.*"

J. C. DONNELL II, president of The Ohio Oil Co., was the recipient of the American Petroleum Institute's Carl A. Young Memorial Award for meritorious service to the petroleum industry. Gage Lund, API vice president for production and vice president, Standard Oil Co. of California presented the award during the Institute's 41st annual meeting Nov. 13-15 in Chicago.

The presentation was the second in the history of the award. The first was in 1958 to Jake L. Hamon of Dallas, an independent oil operator.

R. G. SEARIGHT has been appointed Head of Group Trade Relations Division, Shell International Petroleum Co. Ltd., in succession to **V. S. BUTLER, C.M.G.**, who is retiring.

E. J. G. TOXOPEUS has been appointed general manager of Shell Nederland Chemische Fabrieken N.V. at Pernis. **TH. P. VAN DEN BERGH** remains general manager of Shell Nederland Raffinaderj N.V.

OTTO N. MILLER has been elected president of Standard Oil Co. of California, succeeding **T. S. PETERSEN**, who has retired. R. Gwin Follis continues as the company's chief executive officer. Miller, 52, has 27 years experience with the company, notably in refining. Eastern Hemisphere operations and research. He has been a director since 1959 and a vice president since 1954.

B. E. BLAKELY, who has been head of finance division, Shell Tankers Ltd., since 1959, has been appointed head of chartering division.

P. B. BOLTIES has been appointed by Shell Group Area Co-ordinator, Chemical, North Europe (including Benelux), in succession to **G. W. ATKINSON**, who is joining Elastomers Marketing Division, in the organization of the Marketing Co-ordinator, Chemical. Boltjes has been succeeded as Area Co-ordinator, Chemical, South Europe, France and North Africa, by **D. G. HOMFRAY-DAVIES.**

O. N. Miller

N. M. L. Watson

N. M. L. WATSON to vice president and director of Asiatic Petroleum Corp. Watson, who will also serve as assistant to the president, joined Shell Petroleum Co. in London in 1937. Since 1959, he has been with Bataafse Internationale Petroleum Mij, The Hague, as area co-ordinator for South Europe, and was area co-ordinator for North Europe when he accepted this latest appointment.

J. A. BLAIR has been appointed controller and secretary, Shell Tankers Ltd.

DR. ALEXANDER MILLER, long-time negotiator for Standard Oil Co. (New Jersey) has retired after a long and distinguished international career. Born November 12, 1901, Dr. Miller reached the compulsory retirement age of 60 (for employees abroad) during November. He and his wife will live in Rome and pursue his studies of history there, particularly the history of art. Dr. Miller's long career with Jersey Standard began in 1926 where he entered the Paris office. Concerned primarily with Iraq Petroleum Co. affairs, he later became advisor on legal and land matters in Romania, and a negotiator in Yugoslavia for the company in 1938. The war broke out and Dr. Miller was interned until 1945. He still carries a photograph of himself in the concentration camp. When things get bad, he says, he looks at it and thinks they once were a lot worse.

After World War II he resumed service with Jersey as representative for the Producing Coordination Department in Italy. He took part in many concession negotiations and was manager of Esso Turkey, Inc. in 1954. Since that time he has been in Italy and working on corporate reorganization in Germany. Dr. Miller speaks six languages and feels strongly that language proficiency should be required of company representatives abroad.

A total of 16 key appointments have been made across Canada by British American Oil's manufacturing department, including six at the Toronto head offices.

Reporting to L. P. Blaser, general manager of manufacturing, will be three managers in charge of newly realigned responsibilities: **R. C. BEAL**, formerly chief engineer, becomes manager of engineering; **R. O. CAMPBELL**, chief chemist, becomes manager of product development; and **R. E. HARRIS**, manager of Edmonton refinery, becomes manager of planning and services. Also reporting to Blaser is **R. A. McLAREN**, formerly administrator, organization and training, who becomes personnel administrator. Other head office changes: **R. D. MEAGER**, assistant manager of Calgary refinery, becomes co-ordinator of mechanical engineering; and **S. K. McWALTER**, operating superintendent at Port Moody refinery, becomes co-ordinator of process engineering.

Refinery changes were as follows:

At Clarkson: **J. L. STOIK** to assistant manager, from same post at Moose Jaw; **H. A. HORNFELT** to manager of pumping and blending, from assistant manager at Port Moody; **G. C. DOCKEN** to manager of engineering and maintenance, from head mechanical engineer to manufacturing department at Toronto; and **K. R. EVANS** to manager of operations, from operating superintendent at Clarkson.

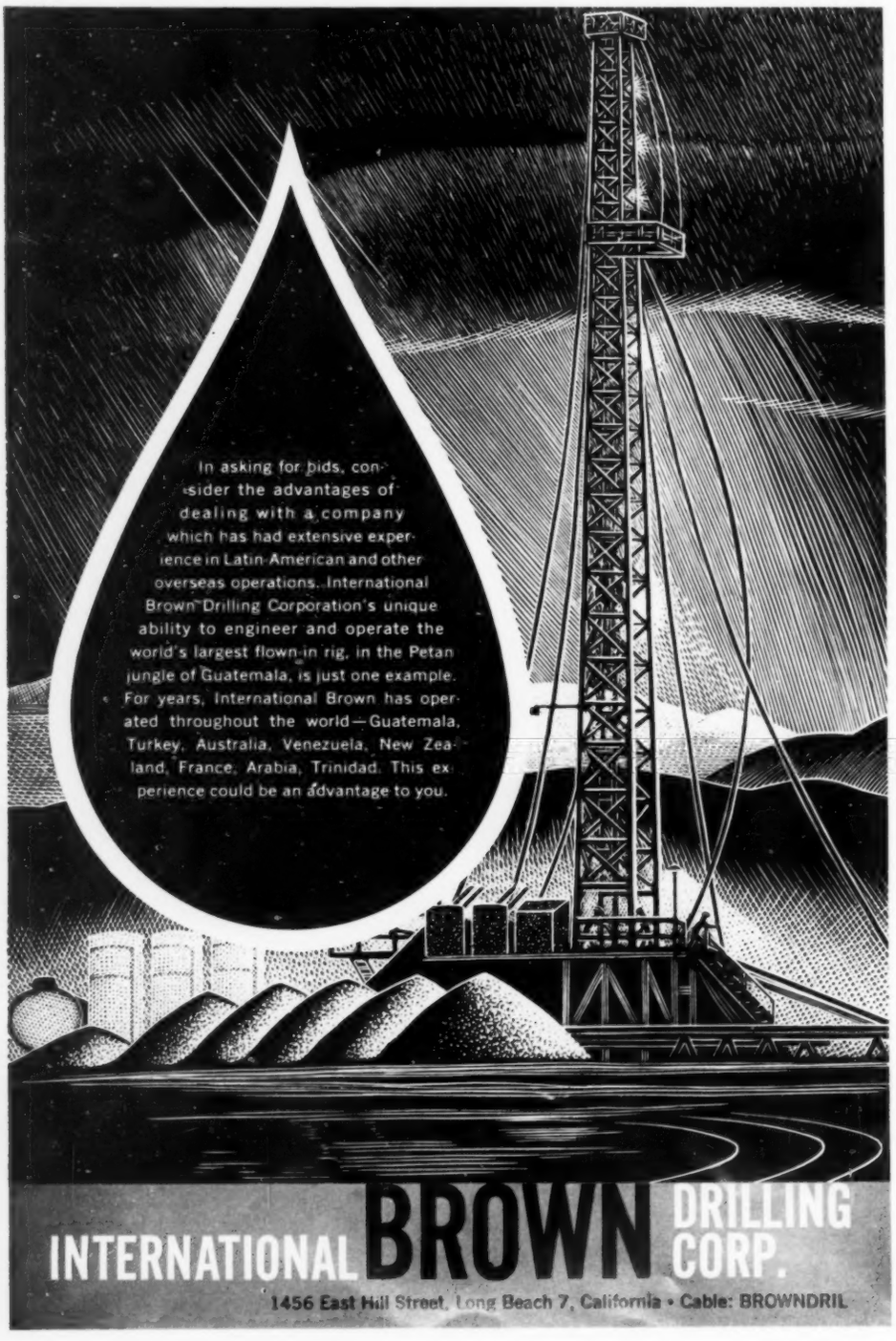
At Edmonton: **R. M. DONALD** to manager from assistant manager; **J. W. THOMAS** to assistant manager from head office in Toronto.

At Montreal: **F. L. JOHNSON** to assistant manager, from head process engineer at Toronto; and succeeding **F. F. ATKINSON**, transferred to head office.

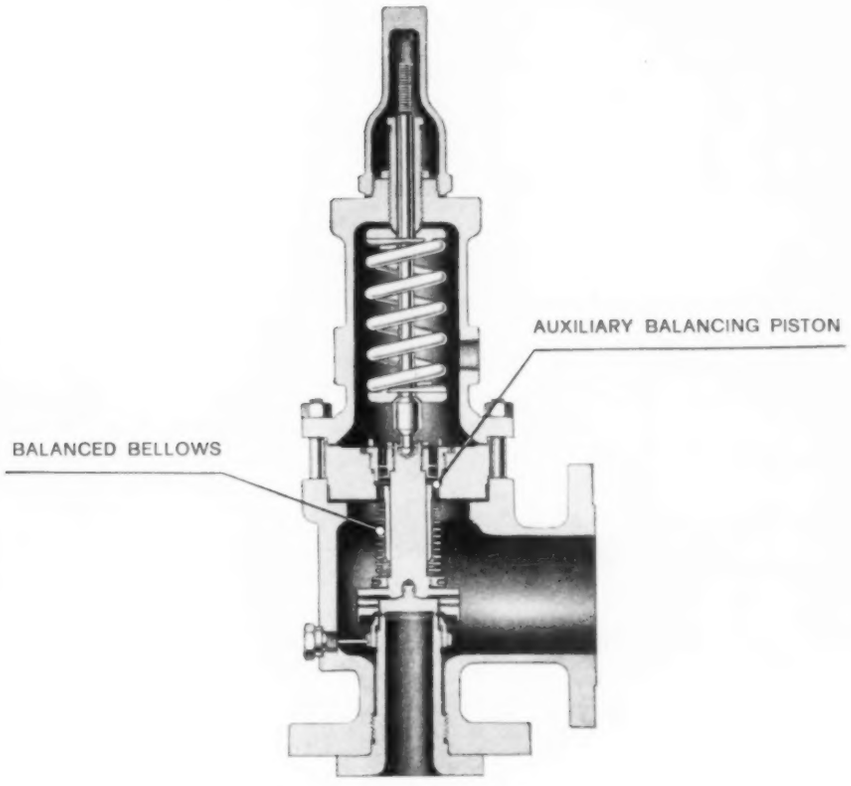
At Port Moody: **D. G. BERRY** to assistant manager from same post at Clarkson.

At Moose Jaw: **K. C. REEVES** to assistant manager, from mechanical superintendent at Moose Jaw.

At Calgary: **H. B. SCOTT** to assistant manager, from operations control administrator at Clarkson.


In asking for bids, consider the advantages of dealing with a company which has had extensive experience in Latin American and other overseas operations. International Brown Drilling Corporation's unique ability to engineer and operate the world's largest flown-in rig, in the Petan jungle of Guatemala, is just one example. For years, International Brown has operated throughout the world—Guatemala, Turkey, Australia, Venezuela, New Zealand, France, Arabia, Trinidad. This experience could be an advantage to you.
INTERNATIONAL BROWN DRILLING CORP.
1456 East Hill Street, Long Beach 7, California • Cable: BROWNDRIL

Consolidated Bellows Relief Valves With Auxiliary Balancing Piston Guarantee Maximum Protection



Since their introduction in 1958, Consolidated Safety Relief Valves with Balanced Bellows and Auxiliary Balancing Piston have been providing the ultimate in positive protection.

The Consolidated Bellows Seal reduces the effect of back pressure on performance characteristics such as capacity, set pressure, and reseating pressure. If the bellows ruptures, the Balancing Piston directly above it immediately re-establishes the pressure balance. Performance characteristics of the valve remain the same as when the bellows was intact.

You can be sure of peak performance and maximum protection with Consolidated Safety Relief Valves, Bellows and conventional designs.

Licensees, listed above right, welcome the opportunity to assist you. Meeting the world-wide demand for valves, pressure gauges and pneumatic transmitters, industrial thermometers and temperature regulators, they will gladly supply specific product information and application data. Write for Bulletin 1935 for information concerning Consolidated Safety Relief Valves with Balanced Bellows and Auxiliary Balancing Piston.

IN ENGLAND

Dewrance & Co. Ltd., London

Ashcroft Duragauges
Ashcroft Pneumatic Transmitters
Consolidated Safety Relief Valves
Consolidated Safety Valves
Consolidated "Maxiflow" Safety Valves
Consolidated "Electromatic" Relief Valves

IN CANADA

Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Ashcroft Gauges
Consolidated Safety and Safety Relief Valves
Hancock Bronze and Steel Valves
Ashcroft Bi-Metal Thermometers
Ashcroft Temperature Regulators

IN FRANCE

Sapag, Paris

Consolidated Safety Relief Valves
Hancock Steel Gate and Globe Valves
Hancock Steel "Flocontrol" Valves

IN AUSTRIA

Hubner & Mayer, G.m.b.H.

Consolidated Safety Relief Valves
Consolidated Safety Valves

IN ITALY

Societa Carraro & Co., Milan

Consolidated Safety Valves
Hancock Temperature Regulators

Filotecnica Salmoiraghi—SPA, Milan

Ashcroft Duragauges

IN BELGIUM

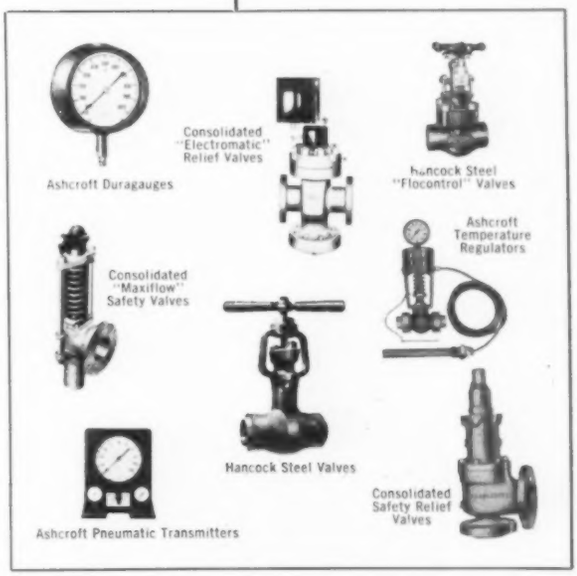
Ateliers Jasper, S.A., Liege

Consolidated Safety Valves

IN WESTERN GERMANY

Deutsche Babcock & Wilcox Dampfkessel-Werke, Oberhausen (Rheinl)

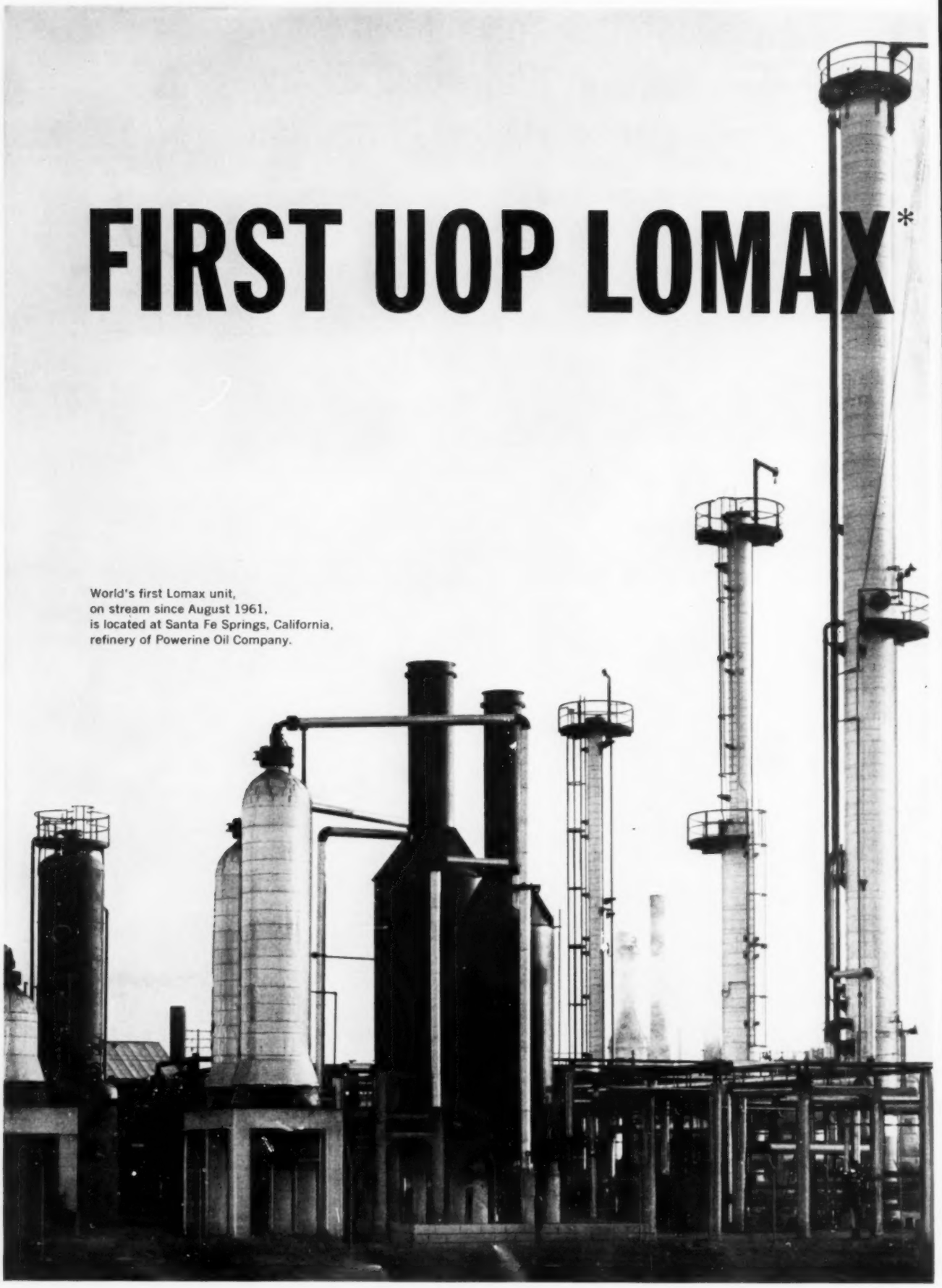
Consolidated Safety Relief Valves
Consolidated Safety Valves
Consolidated "Maxiflow" Safety Valves



MANNING, MAXWELL & MOORE, INC.

All Areas Except Western Hemisphere: Manning, Maxwell & Moore, S. A., Fribourg, Switzerland
Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario
Latin America: Export Division, Chrysler Bldg., New York, N. Y.

FIRST UOP LOMAX*

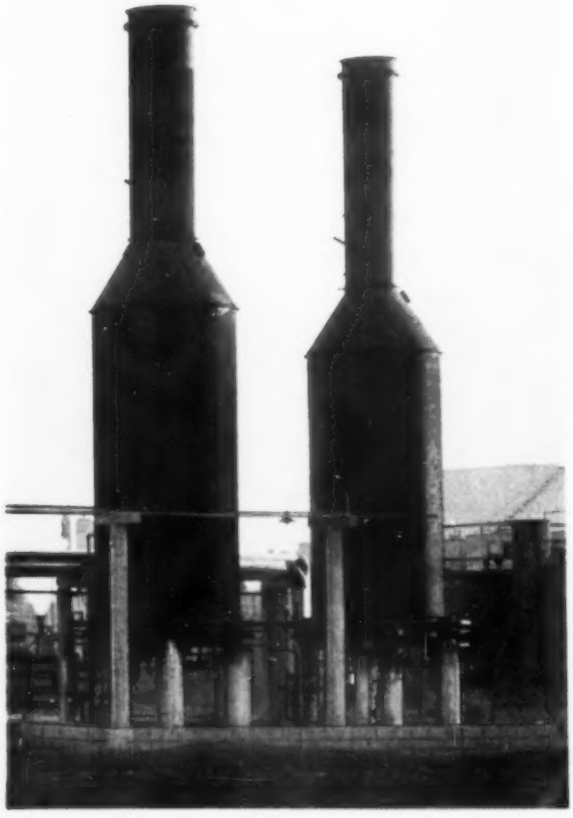


World's first Lomax unit,
on stream since August 1961,
is located at Santa Fe Springs, California,
refinery of Powerine Oil Company.

INSTALLATIONS...

Illustrate flexibility, adaptability to market changes.

Already two installations of UOP's new Lomax process are under way. Both provide significant illustrations of the ways in which the process enables refiners to produce the end product their customers want to buy.



ON STREAM AT POWERINE . . . Now on stream at Powerine Oil Company's refinery in Santa Fe Springs, California, is the world's first Lomax unit . . . designed to produce 115 volume per cent of saturated gasoline from refinery distillate . . . 2,537 BSD of C_4-plus gasoline from a combined feed of 440-656°F. boiling range diesel fuel and 200-424°F. thermally cracked naphtha. Nominal charge capacity is 2,200 BSD. However, company officials expect to increase throughput to 3,000 BSD.

APCO UNIT NEXT . . . Under construction is the 2,950 BSD Lomax unit at the Arkansas City, Kansas, refinery of the APCO Oil Corporation. Designed to convert middle distillate oil into high octane gasoline, the new unit will produce 115 barrels of 10-lb. vapor pressure gasoline for each 100 barrels of oil charged. Charge stocks will be combined catalytic, light cycle and virgin gas oil. The unit will produce light gasoline (C_5-C_6) with a 97.5 leaded octane rating. Installed as a major step in a modernization program, the new unit will enable APCO to shutdown existing thermal cracking operations . . . and to maintain its position of supplying high quality products to jobbers and dealers.

MAXIMUM PRODUCT FLEXIBILITY . . . No matter what your geographic location, climatic conditions or other demand variables, the flexibility inherent in the Lomax process should pay significant dividends. Lomax allows the refiner to offer more of the products in demand at any given time . . . gasolines, kerosines, heating oils, jet fuels, whenever your customers are ready to buy. Lomax, essentially a cracking-with-hydrogen process, permits higher liquid yields . . . up to 120 barrels per 100 barrels of charge stock. Lomax middle distillates and gasolines have extremely high purity.

UOP's engineers will appreciate an opportunity to show you how Lomax can provide economic advantages in your specific refining and marketing situation.

*Trademark

UOP

UNIVERSAL OIL PRODUCTS COMPANY
30 Algonquin Road, Des Plaines, Illinois, U.S.A.
WHERE RESEARCH IS PLANNED WITH PROGRESS IN MIND

INTERNATIONAL NEWS AND NOTES

ARGENTINA — Esso and Shell reportedly have agreed to loan YPF, Argentine government oil agency, $10 million each at 5% in return for additional acreage. Esso is to receive 6,170 square miles chiefly in La Pampa and Neuquen provinces, and Shell 7,950 square miles adjoining Esso's acreage, chiefly in La Pampa. Esso also will pay YPF $400,000 for exploration work done. YPF will repay the $10 million loan with 30% of crude produced to be delivered to Esso refineries at $2.35 per bbl; remaining 70% to be paid in cash. Shell will pay YPF, in addition to the $10 million loan, $1,750,000 for exploration work done—with repayment of the loan by YPF on same terms as with Esso. Shell also agrees to buy 705,000 bbl of fuel oil by year-end 1961 and 1,221,000 bbl by March 31, 1962, on condition Argentine government cancels 20% export tax on ships' bunkers.

ARGENTINA—Cities Service has announced acquisition from L. R. Development Ltd. of 53% net interest in operation and development of more than one million acres in western and southern Argentina. Properties are said to be producing currently some 20,000 b/d, about 10% of Argentine crude production. L. R. Development, a company headquartered in Nassau, Bahamas, was organized in New York by Carl M. Loeb, Rhodes & Co., and associates, which obtained rights over acreage in 1958. Remaining 47% interest is being retained by Signal Oil and Gas Co., and Union Texas Natural Gas Corp.

ARGENTINA—Mobil Oil Argentina Inc. filed articles of incorporation with corporation dept. of Secretary of State's office in Dover, Del. (USA), listing $10,000 authorized capitalization to deal in petroleum. Corporation Trust Co., 100 West 10th St., Wilmington, Del., is serving as principal office.

AUSTRALIA—Australian Oil & Gas Corp.'s new program for New South Wales includes a projected 2,000-ft "strat" information well in Murray Basin, and a seismic survey near Jerilderie in Oaklands Basin—the latter already having been approved for a federal subsidy.

AUSTRALIA—As of early Oct. 1961, status of Australian wells was as follows: Cabawin East No. 1 by Union Oil drilling ahead at 9,579 ft; Frome-Broken Hill Flaxman's Hill No. 1: testing of gas-producing zones continuing; Beachport surface well of South East Oil (partly owned subsidiary of Santos Ltd.) at 315 ft; rotary rig was being moved to the site to extend hole's depth to scheduled 4,200 ft; Matai No. 3 of Timor Oil extended to 1,578 ft in siltstone with sand streaks. The 800-ft horizons of both Matai No. 1 and No. 3 have been tested; company reports oil and gas shows do not warrant further examination.

AUSTRALIA—Continental Oil and Ohio Oil will spend $2½ million by year-end 1964 on 12,000 square miles in the Ogmore, Duaringa, and Baralaba areas of Queensland. Queensland Mines Minister Evans said agreement with the two USA companies would "hurry along" exploration in Queensland.

AUSTRIA—In view of Austria's steadily mounting crude import requirements, an official Austrian pipeline study group has recommended a pipeline from Trieste to Vienna, a plan originally advanced by Enrico Mattei, ENI's head. The study group has rejected idea of a tie-in with the Comecon line at Bratislava in Czechoslovakia. Interest in project has been shown by Mobil Oil Austria AG and Shell Austria AG—with participation in venture indicated by Esso Standard and British Petroleum. Minimum capacity recommended for the 500-km (310-mile) line is one million tons yearly (20,000 b/d), but 2 to 2½ million tons is regarded as the most economical. To be ready for 1966, when Austria's rising crude imports are envisaged to require such a line, construction would have to start in 1963. Total costs are estimated at 800 million schillings ($32 million).

BURMA—Burma Oil Co. (1954) Ltd. reports its test well Palanyon No. 31, spudded last May 9, struck moderate amount of oil accompanied by water on July 10, 1961. Originally projected to 4,000 ft, well was completed at 2,896 ft after encouraging indications at 2,600 ft and below. Further testing will be required to evaluate well's potential. The test well is situated in Palanyon field, about six miles south of Minbu on west bank of Irrawaddy River.

CANADA—Producers are looking to eastern refiners to provide most of the increase in oil markets next year. Canadian crude exports in 1961 are expected to be up about 67,000 b/d over 1960, to an average 180,000 b/d for the year. This is felt to be a much faster growth rate than can be sustained, and the export increase in 1962 is expected to be less than half this amount.

CANADA—Two new oil-production records will have been set during 1961 for September and November, according to purchasers' nominations and forecasts. September should average 676,984 b/d and November 696,615 b/d. November is expected to show largest increase of year, with 178,374 b/d over Nov. 1960.

CANADA—California Standard Co. has announced new field with discovery of Pacific-Calstan B.A. Kaybob 10-4064-18, five miles east of eastern limits of Kaybob field in Alberta. Well flowed 400 b/d of 45.5-gravity crude from a test interval between 9,606 ft and 9,696 ft in the Beaver Hill Lake formation. Follow-up wells are to start immediately. The discovery well is located near a 36-square-mile tract owned by three equal partners: S.O. Calif., Pacific Petroleums Ltd., and British-American Oil Ltd., including an eight-section block on which the well was drilled.

CANADA—Upon stockholder approval, Amurex Oil and Murphy-Canada Oil Co. (subsidiaries of the USA Murphy Corp.) will merge into a new Canadian corporation to be known as Murphy Oil Co. Ltd. Merged company will have $16 million in assets, and production of about 1,750 b/d of crude and condensate and more than 3 mmcf/d of gas. It will also have marketing properties in the Canadian East.

CONGO—After a year-long offshore exploration program in the Gabon, SPAFE and Mobil will spend four months exploring along the Congo, about 11 meters off the Congolese coast. With wells projected to 2,200 to 2,500 meters in 20 to 30 meters of water, program's cost is estimated at $12,248 per day. Onshore drilling is to be resumed during 1962. For first time, Congo became an oil exporter in 1961—and expects 1961 production to reach 90,000 metric tons on basis of first eight months' actual (through Aug.) of 59,321 tons. By August, exports had reached 33,952 tons.

EAST AFRICA—One geophysical crew has been operating in East Africa during 1961 — first in Pandangua area of Kenya, then on Pemba Island, and currently in Pugu area of Tanganyika.

FINLAND—Finland imported 617,553 metric tons (24,000 b/d) of crude in first half of 1961—with the second quarter accounting for 229,387 tons, of which 125,436 came from the USSR and 103,951 from Iran.

FRANCE—By Sept. 1961 crude production in the franc zone, at average 301,600 b/d, had begun its recovery from slowdown occasioned by disturbances in Tunisian area and shut-in African production. Since early October, the pipeline through Tunisia has been operating normally—with Oct. output estimated at the June average of 430,900 b/d. The 301,600 b/d figure for Sept. was made up 238,000 b/d from Sahara fields, 46,400 from metropolitan France, and 17,200 b/d from Gabon and Congo.

GERMANY (West)—Continental Oil is negotiating for a share of the West German marketing firm Dill AG, of Aschaffenburg, and to expand the present Dill service-station network. Move is part of Conoco's effort toward an outlet for its Libyan crude. In 1960 it acquired the 300 to 360 services stations of Sopi. Recently it signed a 15-year contract with Deutsche Erdoel to supply the latter's Heide refin.

INDIA—India has ordered, effective Oct. 1, 1961, the third cut in product prices within three years. The newly decreed prices will cost the three international marketers (Burmah-Shell, Standard-Vacuum, and Caltex) another $31.5 million yearly. Mines and fuels minister Malaviya said the $31.5 million saving to India will be accomplished by (1) a reduction in 1962 of $10.5 million in landed cost of product imports, (2) revised discounts—to cost companies another $14.7 million, (3) lower distribution charges and profits—to cost the marketers an additional $6.3 million.

IRAQ—The stormy early October meeting in Baghdad broke up when Iraq's premier Karim Kassem, during negotiations for a new oil agreement with Iraq Petroleum Co., made demands which were termed "impossible" by a spokesman for SONJ, one of the IPC partners. Premier Kassem is reported to have told negotiators he had prepared legislation to limit operations of IPC and those of Basrah Petroleum and Mosul Petroleum companies as well (SONJ negotiating for all three). Kassem's "final offer" to the negotiators is said to demand (1) 90% of the combined concessions of the three companies in Iraq; (2) increase for Iraq in the present 50-50 profits split; (3) minimum one-fifth shareholding for Iraq in Iraq Petroleum Co.

ITALY—An Italian trade mission headed by president of the Italian chemical firm Snia Viscosa has offered the Russian government 46.5-billion-lire credit to buy Italian products.

ITALY—Official State oil office in Italy forecasts Italian oil consumption from 1961 through 1965 (in thousands of metric tons) as: 1961—21,912 (up 18.49%); 1962—24,509 (up 11.85%); 1963—27,071 (up 10.45%); 1964—29,675 (up 9.62%); 1965—32,113 (up 8.22%).

ITALY—ENI has launched a third drilling platform, the "Perro Nero", built by the Italian State oil agency's affiliate, Nuovo Pignone, at Marina di Carrara port (Tyrrenian Sea). The 18,000-ft Ideco-Pignone barge, built under LeTourneau license, will be used on the Adriatic Sea along the Ravenna coast, where Agip Mineraria discovered natural-gas reserves said to be second only to the Po Valley deposits.

ITALY—ENI plans a 309-kilometer pipeline from the natural-gas field it discovered near Vasto (Abruzzi), said to contain reserves of 10 billion cubic meters. Spanning Abruzzi and Latium regions, line will run to: (1) Vezzano for delivery of 1.25 million cubic meters per day to homes and industries, (2) Terni for 630,000 cu m; (3) Rome for 600,000 cu m.

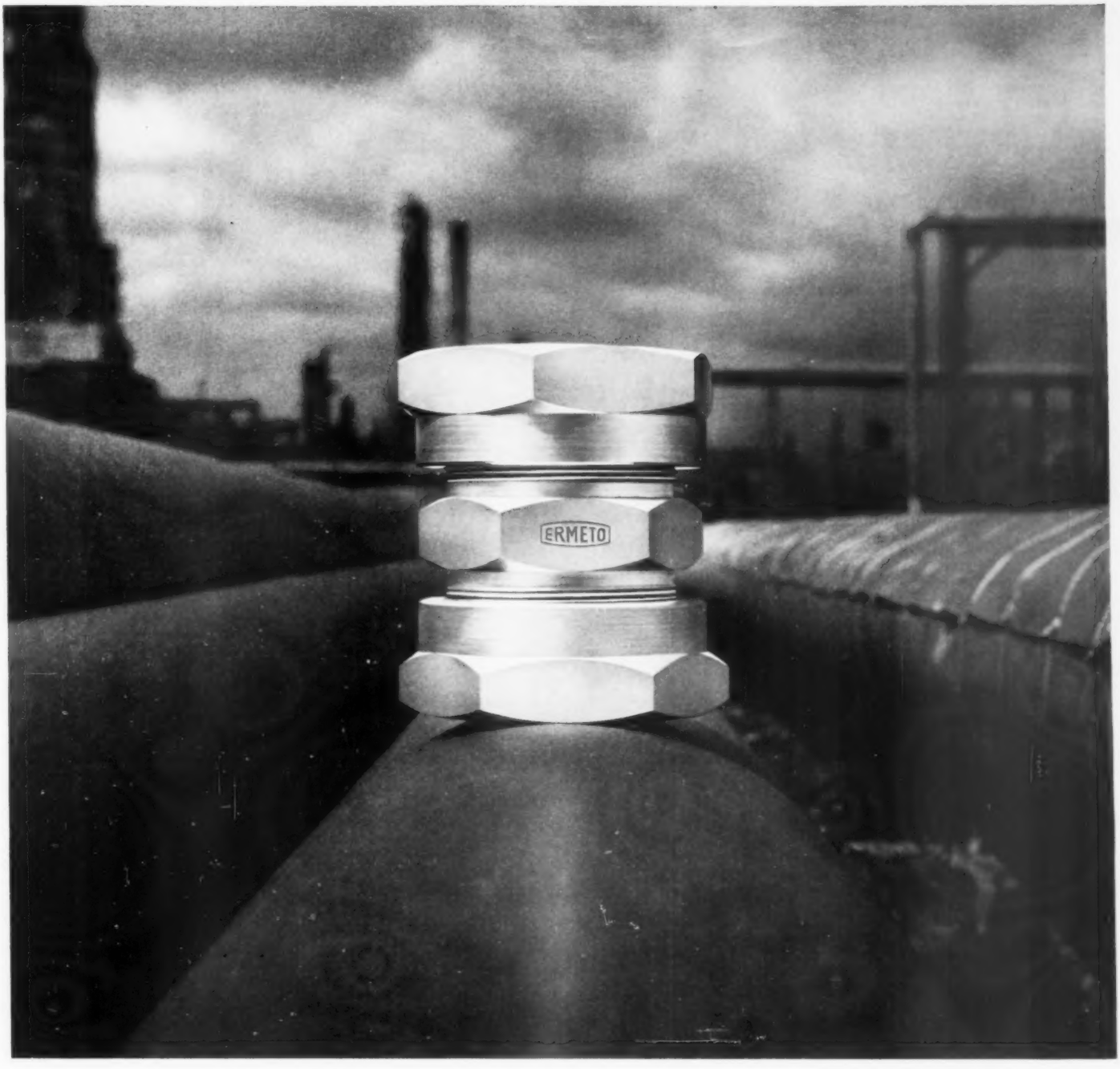
ITALY—Effective date of new four-year Italian-Romanian trade agreement is January 1, 1962. In 1962, Italy will receive from Romania 200,000 tons of fuel oil; 30,000 gas oil; 6,000 gasoline—with other minor products.

ITALY—New Genoa oil port (linked with ENI's Genoa-Aigle-Munich pipeline now under construction) is scheduled for completion latter half of 1962. With capacity to exceed 30 million tons (600,000 b/d), port will be able to accommodate largest supertankers.

LIBYA—Libyan Petroleum Commission—which has protested as "too low" the $2.21 per bbl posted by Esso International for 39.0-39.9 gravity Zelten crude is seeking to get Libyan government to force Esso to raise the price.

MIDDLE EAST—Two resolutions adopted at the Third Arab Oil Congress in Alexandria, Egypt, October 21, recommend that: (1) Arab oil States have greater partnership in management and capital of oil companies operating in their lands, on grounds this would assure the rights of the Arab peoples and guarantee stability of relations between governments and companies; (2) the Congress support the Algerian Arab peoples and their full sovereignty over the Sahara, as well as the oil resources it contains. The first resolution also recommends measures to prevent transport or sale of oil to Israel—with oil companies to be notified they must respect this ban if they wish to preserve their interests in Arab States. The second resolution states "all agreements covering

(Continued on page 72)



WHEN COMPLETE DEPENDABILITY IS ESSENTIAL

In pilot plants and petroleum refineries it is absolutely essential that pipeline couplings must be secure and completely pressure tight. Once again the specification calls for Ermeto . . . Ermeto who provide the largest range of high-pressure pipe fittings in the world, in addition to valves and flexible hose assemblies. Also many non-standard fittings are produced to meet our customers' requirements. Our Technical Advisory Staff are at your service and a copy of the latest edition of the Ermeto catalogue, which is a standard reference for piping layouts, will gladly be forwarded to you on request.

COUPLINGS : VALVES : FLEXIBLE HOSE & END FITTINGS : STEEL & COPPER TUBE.

BRITISH ERMETO CORPORATION LTD

HARGRAVE RD · MAIDENHEAD · BERKS · TELEPHONE: MAIDENHEAD 5100

A MEMBER OF THE ALENCO GROUP OF COMPANIES

ERMETO

(*Continued from page 70*)

prospecting for oil resources and exploiting them, whether in Algeria or any Arab State, are considered invalid unless concluded with the respective national governments, which alone have the right to represent their countries."

NEPAL—Dispatch from Kathmandu, Nepal, says this landlocked Asian country in the Himalayas (bordering USSR and India) is negotiating for oil imports from the Soviet Union under a Russian plan to extend 30 million rubles of aid to Nepal.

NORWAY—Caltex geologists should start drilling for oil near Spitzbergen in the summer of 1962, but the Norwegian State mine inspector believes the Russians may overtake them in the preceding spring. The Russians, who since 1920 (under a treaty with Norway to which the USA is also signatory) have been mining for coal at Spitzbergen, are searching for oil on Edge and Barentz Islands in the eastern part of the archipelago.

PAKISTAN—Oil & Gas Development Corp. Ordinance of 1961, covering all of Pakistan, went into effect Sept. 21. It provides for a three-man board chairmaned by H. M. Zuberi, secretary of fuels, power, and natural resources. With headquarters in Karachi, regional offices will be set up in both East and West Pakistan. The corporation is empowered to: (1) explore geologically and geophysically for oil and gas; (2) conduct drilling and reserves programs; (3) produce, refine, transport oil and gas; (4) collect and publish pertinent statistics and perform related functions.

PAKISTAN—Under recently promulgated national oil agency, Pakistan so far has set up two operating companies wholly owned and controlled by the government: (1) Oil & Gas Exploration Corp., (2) Pakistan National Oils Ltd. Under auspices of first company (for which $10.5 million has been authorized, Russians will direct a $35 million Soviet-financed exploration program. The second company plans to start marketing operations by April of 1962.

PERU—Mobil Oil Co. of Peru hopes for oil in the Aguayita region despite a setback when the drill became stuck at 8,560 ft in its second exploratory well. A plug was set at 7,965 ft, and Mobil is sidetracking.

Cerro de Pasco Petroleum Corp. spudded Oxapampa 7-2 in September 1961, and aims to go to the Aguas Calientes formation. Cerro went to 10,333 ft with Oxapampa 7-1 without indications of gas or oil.

SICILY—Along the Trapany coast, two ships of the French firm Cie. Generale Geophysique, "Sagittaire" and "Gerseau", are conducting a seismic survey in search of offshore oil and gas.

TAIWAN—As outgrowth of year-old liberalized Formosan investment law, the Republic of China soon will open an investment office in New York to attract USA capital to Taiwan. Foreign investment in Taiwan amounted yearly to only $6 million in 1952-59. In 1960, under new law, it picked up to $25 million, and in first eight months of 1961 it had already totaled $23 million—with capital coming largely from Japan, USA, Hong Kong. To induce new investment, the law provides tax exemption, deferments, and reductions. Laws governing remittances and repatriation of capital have also been liberalized recently.

TUNISIA—Tunisian Husky Corp. filed articles of incorporation with corporation dept. of Secretary of State's office in Delaware (USA), listing $100,000 authorized capitalization to deal in oil. United States Corp. Co., Dover, Del., is serving as the principal office.

USSR—The 402-km (250-mile) section on Czechoslovak territory of the 4,500-km (2,790-mile) "Comecon" oil pipeline has been completed. First Soviet crude is to flow on December 20, 1961, from Brody (Ukraine) via Ushgorod to the Slovnaft refinery at Bratislava. East German pumps will lift the crude across the Carpathian Mountains with a pressure at 60F of 853.4 psi. By 1965, the Comecon pipeline is to transport 15 million tons of Soviet crude to East Germany, Poland, Czechoslovakia, and Hungary—quantity later to be raised. Czechoslovakia is supplying for Comecon pipes and high-pressure installations; East Germany, pumps and pipes; and Hungary, telecommunication installations.

USSR—The USSR is expected to continue at expanding rates its low-priced oil exports to Western Europe, according to the United Nations' Economic Commission for Europe. An ECE study states that net imports of crude and oil products by Western European countries from all sources rose about 17% in 1960, but the level of imports from Soviet bloc was at least a third higher. Biggest importer of Soviet oil supplies has been Italy, which increased them by 50% in value and nearly 80% in volume—to 3.9 million tons in 1960 from 2.2 million in 1959.

USSR—According to US Interior Dept., the Soviet Union has increased its tanker fleet by 108 vessels during past 10 years, or 90% of its present total tonnage—with a 250-vessel fleet planned by 1965. Despite its efforts toward self-sufficiency in tankers to export its burgeoning oil output at prices well below the world market, Russia today has only 2% of the carrying capacity of the world's tanker fleet. However, the present world tanker surplus has been readily available for chartering by the Russians for export of their oil.

VENEZUELA'S Oil Ministry predicts oil-company profits after taxes in 1961 will total $444.7 million, up $42.1 million from $402.6 million in 1960, or a rise of 10.4%. The government will get $895.1 million in taxes, up $64.7 million from $830.4 million in 1960, or a rise of 7.9%. Profits-tax split thus shows a relative decline in government's share to 66.8% in 1961 from 67.3% in 1960.

WORLD—Virtually all tanker tonnage flying flags of nations which have recognized the new independence of Syria could grind to a halt at the Suez Canal should Egypt get away with a follow-up to her recent action with respect to a Turkish tanker. The 21,000-ton Japanese-built "Batman," a tanker under charter to the Turkish government's State oil company, recently en route to Ras Tanura in the Persian Gulf, was turned back at Port Said.

YUGOSLAVIA—Oil men foresee a yield of 1,200,000 (24,000 b/d) metric tons of crude oil in the next five years from the fields of the Vojvodina area. A recent find of oil near Mokrin, in the northwest of Yugoslavia, also found natural gas.

Some sources also say not more than 10% of the oil and gas areas in Vojvodina province, including Morkin, have been examined. They add that the Elemir area seems to contain twice the oil originally estimated. The wells in operation yield about 300 metric tons of crude a day.

ZANZIBAR—Off the East African coast opposite border between Kenya and Tanganyika, Shell-BP Development Co. expects in December to start a deep test on Pemba Island (part of Zanzibar Protectorate), about two miles south of the town of Tundaua.

AXELSON-GARRETT

TYPE "C"

CIRCULATING VALVE

Full Circulating Capacity!

Unmatched for reliability, the Axelson-Garrett Type "C" Circulating Valve has now been further improved to offer all of these exclusive features: Perfect Sealing — Full Circulating Capacity — Repeatable Shifting — Positive Locating — Slim Dimensions.

Designed primarily for the displacement of well fluids, Type "C" valves may be used on permanent type completions, for selective production or for well remedial work.

When installed, the large ports in the mandrel and large annular space between sleeve and mandrel assure full capacity. The unique design and compact seals have made possible this full capacity in a valve with minimum O.D. Its characteristics make it an ideal tool for use in critical diameter parallel string completions.

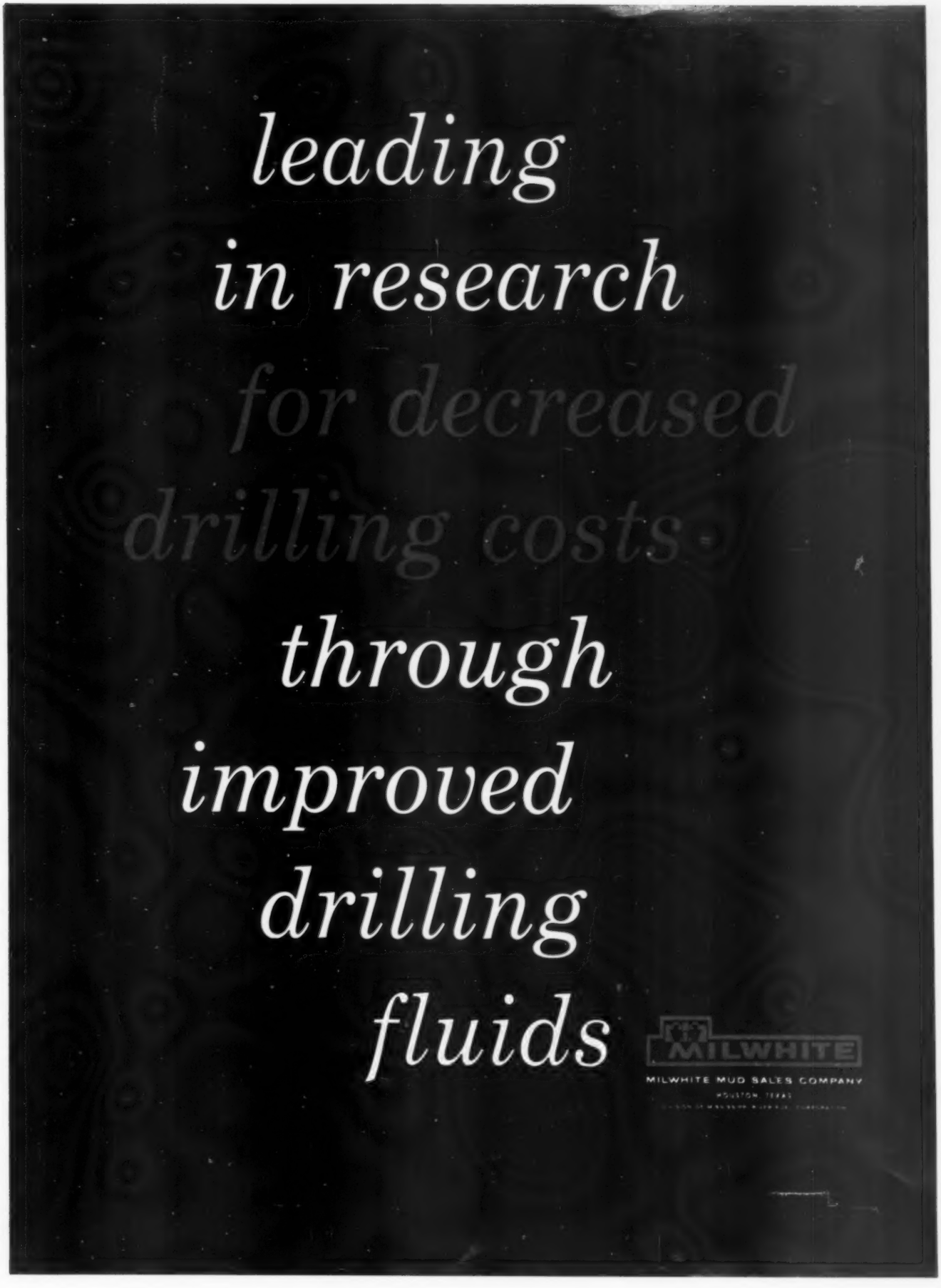
When opening or closing the valve, the shifting tool automatically seats into the proper shifting position. When shifted the internal profile of the valve changes. The shifting tool can be moved only if the valve has been fully shifted, giving the operator a positive check on the position of the sleeve.

A new Brochure (#CVC) is now available showing the many services that can be performed by this valve. Illustrations include shifting and checking the valve when opening or closing. Write for your copy today, or check with your Axelson-Garrett man.

USI Axelson-Garrett

DIVISION OF U.S. INDUSTRIES, INC.

"Products Designed to Give Oil a Lift" General Offices: Longview, Texas


leading
in research
for decreased
drilling costs
through
improved
drilling
fluids
MILWHITE
MILWHITE MUD SALES COMPANY

International Gas Meeting

Economics of the gas industry will be surveyed in a conference to be presented by the International Oil and Gas Educational Center in Dallas, March 1-2, 1962. The two-day meeting, to be held at the Southwestern Legal Center, will be of special interest to lawyers, landmen, economists, geologists, petroleum engineers, and management of the oil and gas industry.

Subjects to be reviewed, and lecturers are: Introduction to the problem of developing adequate supplies of natural gas. Ira H. Cram, chairman of the executive committee, Continental Oil Co., New York City; Economic aspects of natural gas supply, Bruce C. Neutschert, director, Washington, D. C. office, National Economic Research Associates, Inc.

Foreign gas reserves, occurrence, production, Lewis G. Weeks, petroleum exploration consultant, Westport, Conn.; Migration and accumulation of natural gas as exploration factors, Frank B. Conselman, consulting geologist, Abilene, Texas; Competition, Conservation and control, William J. Murray, Jr., chairman, Railroad Commission of Texas.

Progress in gas storage, Raymond W. Todd, vice president, Pacific Lighting Gas Supply Co., Los Angeles; Marketing by the producer of natural gas through means — conventional and unconventional, Wendell J. Doggett, general attorney, Panhandle Eastern Pipe Line Co., Kansas City, Mo.

Relationship between petrochemical diversification and natural gas, R. W. Thomas, vice president of research and development, Phillips Petroleum Co., Bartlesville, Okla.; Characteristics and problems of Interstate natural gas transmission, J. W. Hargrove, financial vice president and secretary, Texas Eastern Transmission Corp., Houston; Future life of the natural gas industry, Lyon F. Terry, associate., Lehman Brothers, New York City.

Copies of the program may be obtained from the Registrar, Southwestern Legal Foundation, 3315 Daniels, Dallas 5, Texas.

Texaco Sees World Demand Rise at 5%

Augustus C. Long, board chairman of Texaco, Inc., predicted recently that the free world petroleum demand will rise about 5% a year through 1965, and expressed "complete confidence" in the future of the oil business.

He forecast that global demand would rise from 18.9 million barrels a day in 1960 to more than 24 million barrels a day in 1965. "Despite the challenges that lie ahead, there can be little question as to the future of the industry as a whole," Mr. Long said.

The demand forecast in free foreign countries is more favorable than that for the USA in 1961, which should be about 2% more than 1960. He cited the following oil demand increases in major nations during the first half of 1961 over the comparable period in 1960: United Kingdom, 7%; France, 9%; Italy, 16%; West Germany, 17%; and Japan, almost 40%.

"Not all of the Free Foreign World is expanding its demand at these rates, but the trend is definite and pronounced, with the result that the international companies such as ours can look forward to continuing increases in consumption," Mr. Long stated. He noted that free foreign demand will rise an average of almost 8% a year through 1965.

Latin American Oil Needs Capital

Latin America has a tremendous need for a private capital directly for business enterprises—to build factories, equip them with modern machinery, and establish systems of distribution—in addition to public funds envisioned in the $20 billion Charter of the Alliance for Progress, according to M. J. Rathbone, president of Standard Oil Co. (New Jersey). Speaking before the American Chamber of Commerce in Buenos Aires on the occasion of the fiftieth anniversary of the founding of Jersey's affiliate in Argentina, Esso S.A.P.A., Rathbone pointed out that much private capital is also generated in Latin America itself.

"The reinvestment of this capital has played a vital role in countries such as Argentina, and we must be ever-mindful that it is vitally necessary for a government to maintain conditions which will continue to attract this reinvestment."

"However," Rathbone said, "there is a consensus of opinion in Latin America, I believe, that domestically generated capital must be supplemented by private foreign capital funds to attain the growth rates needed in the future. The Alliance for Progress recognizes this and expects about one-quarter of the funds from abroad to come from private sources."

As an example of the effectiveness of government and private business working together toward the economic development of a country, Rathbone cited the example of the development of oil production in Argentina.

"Up until a few years ago, the Argentine government was spending over a quarter of a billion dollars a year in foreign exchange to pay for oil imports. Moreover, it was faced with the prospect of even higher outlays as the nation's fuel needs grew. Increased domestic oil production, if it could be achieved, was an obvious answer to the problem.

"The new policy of the Argentine government of welcoming foreign capital to carry on exploration and development of new oil reserves has been remarkably successful," Rathbone said. "By the end of this year, Argentina should be self-sufficient in oil for the first time in its modern history."

New Mission Drill

A new 6-page brochure describing the Mission Series 350 Hammerdril for fast, straight-hole, percussion air/gas drilling of oil and gas wells is now available from Mission Manufacturing Co., Houston, Texas. This tool is leased to the drilling contractor, enabling him to cut drilling costs without an actual investment.

The brochure gives nearly twenty case histories from oil areas in the USA and Canada in which the new Series 350 Hammerdril provided either higher penetration rates or straighter holes while using fewer bits than conventional air rotary drilling.

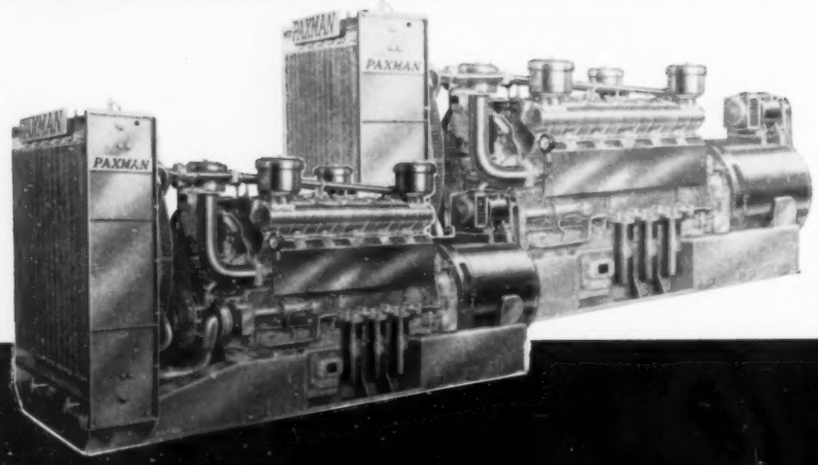
The brochure also includes specifications for various sizes of Mission Series 350 Hammerdrils, pictures all Hammerdrill parts, and explains the principles of the tool's operation.

This brochure is available from Mission Manufacturing Co., P.O. Box 4209, Houston, Texas.

Secondary Oil Recovery Process

"How to Recover More Flood Oil Faster" is the title of a bulletin by Clark Bros. Co., Division of Dresser Industries, Inc. Bulletin 209 describes economic and other advantages of the Orco process—one of the newest methods of secondary oil recovery. Copies are available from Clark Bros. Co., Olean, New York, or from company representatives in principal industrial centers.

DOUBLE DUTY



for *PAXMAN* refinery diesels

On the spot, push-button power during the building of a refinery . . . standby duty for essential services when building has finished . . . Paxman engineer four ranges of diesels specifically for these jobs in refineries . . . supply them as complete units with remote or fully automatic control, or as base engines only.
World-wide experience of supplying diesel power to oil industry specifications makes certain of real dependability in every Paxman installation.

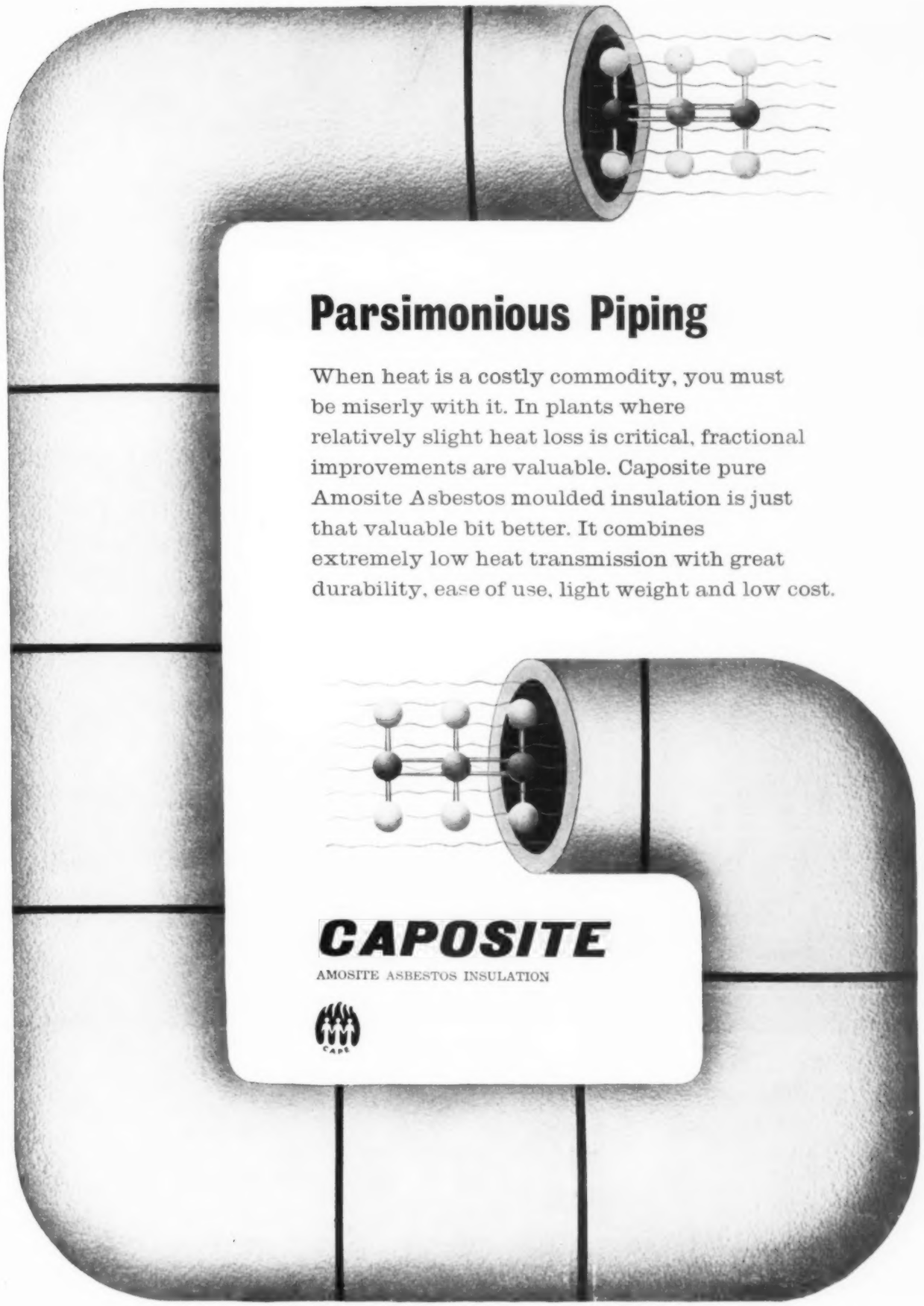
Paxman also produce the same ranges of engines for refinery firefighting applications . . . supply these too with remote or automatic controls.

PAXMAN *refinery diesels*

RPH: 160-680 b.h.p. 'VENTURA': 1100-1735 b.h.p.
YL: 480-2270 b.h.p. 'ALCO': 550-2400 b.h.p.

Paxman diesel engines are backed by a world-wide service which brings you men and spares whenever and wherever you want them.

DAVEY, PAXMAN & CO. LTD., COLCHESTER, ENGLAND A member of the RUSTON Group



Parsimonious Piping

When heat is a costly commodity, you must be miserly with it. In plants where relatively slight heat loss is critical, fractional improvements are valuable. Caposite pure Amosite Asbestos moulded insulation is just that valuable bit better. It combines extremely low heat transmission with great durability, ease of use, light weight and low cost.

CAPOSITE

AMOSITE ASBESTOS INSULATION

Enquiries to: **Cape Insulation and Asbestos Products Ltd.** *(A Subsidiary of The Cape Asbestos Company Ltd.)*
114 & 116 Park Street, London, W.1. Telephone: GROsvenor 6022. Cables: Incorrupt London
or to: Cape Asbestos (Canada) Ltd., 200 Bloor St. East, Toronto, Ontario. Capam[illegible] SpA, via Sant' Autonino 57, Turin, Italy.

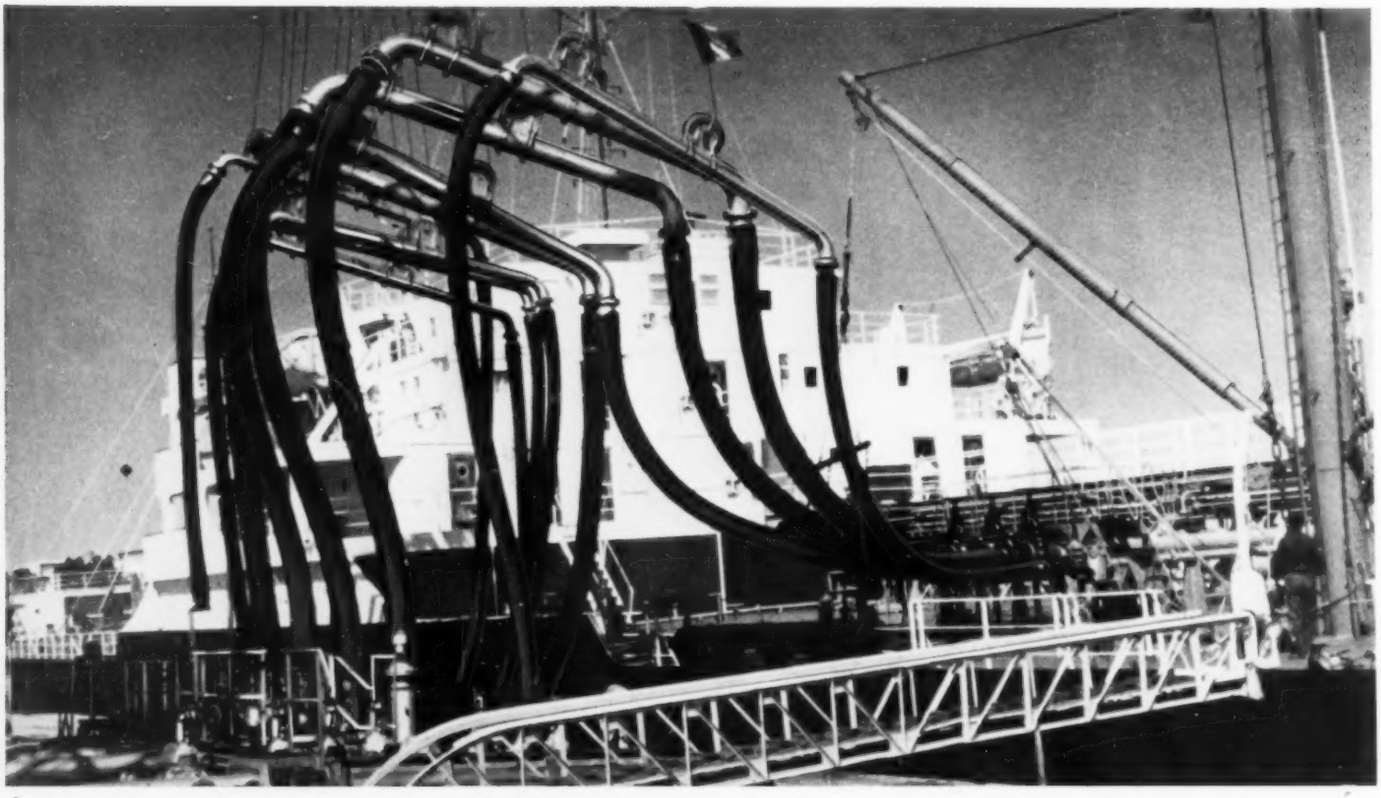
AMAZON OIL SUCTION AND DISCHARGE HOSE

The introduction of stranded steel cord in place of fabric plies gives not only addditional flexibility and strength but greatly reduces the overall elongation, a factor now recognised of prime importance in the heavy duty high-flow rate oil hose. Original equipment orders during 1961 are proof of the outstanding quality of this new development in oil hose.

Conditions and Amazon Hose Types Required

Discharge only	H-1515
Suction and Discharge	H-1818
Liquefied Petroleum Gases	H-2222
Submarine	H-2323
Hot Bitumen	H-2424

Manufactured in rough or smooth bore in sizes up to 20" i.d. nominal and in lengths up to 50 feet.



Photograph by courtesy of the Chambre de Commerce de Marseille—Port of Lavera

Brochures showing weights and bending radii, etc., will be supplied on application to:

U. S. Rubber

Export: U. S. Rubber International (Gt Britain) Ltd.
Home: The North British Rubber Company Ltd.

ABBey 5611

62/64 HORSEFERRY ROAD, LONDON, S.W.1.

World famous for: OIL • AIR • STEAM AND WATER HOSE • DOCK FENDERS • EXPANSION JOINTS • CONVEYOR BELTING • POWERGRIP BELTING • TYRES • FOOTWEAR • WATERPROOF CLOTHING

Your fastest way to locate those refiners who have Equilibrium Catalysts for sale is to use this new service from Davison. *

THE CATLOCATER

AUGUST, 1961

As a part of our continuing customer service program, Davison provides this bi-weekly availability bulletin on Equilibrium Fluid Cracking Catalysts. The sources listed herein and quantities available are constantly subject to change so that these figures are approximations only, based on the latest information available at the time of this mailing.

Whenever you need information or assistance concerning Cracking Catalysts, Mullite, Aluminas, Microtraps, and allied products, the number to call is 727-3912 in Baltimore.

GRACE
DAVISON CHEMICAL

AVAILABILITY OF EQUILIBRIUM FLUID CRACKING CATALYSTS

TYPE	QUANTITY	SOURCE
13X	50 Tons	Fphymia Refining Company, Midtown, U.S.A.

*The CATLOCATER is **free** on request to anyone interested in Equilibrium Catalyst. Listings are inserted as a service. Call the number above or write:

W. R. GRACE & CO., Davison Chemical Division, 101 N. Charles St., Baltimore 3, Md., Att: Mr. J. W. Cugle - Catlocater Dept.

Pan Am Buys Honolulu

E. F. Bullard, board chairman of Pan American Petroleum Corp., has announced purchase of producing oil and gas properties from the Honolulu Oil Corp. of San Francisco. Pan American is the exploration-production affiliate of Standard Oil Co. (Indiana).

Pan American acquired the working interests of Honolulu in substantially all of its oil and gas properties in the Mid-Continent, Northern Rocky Mountain and Canadian areas, subject to an excepted and retained production payment on certain of the properties, and an undivided one-half interest in Honolulu's Alaskan properties. A group of seven corporations purchased from Honolulu the excepted and retained production payment.

Tidewater acquired the working interests of Honolulu in substantially all of its oil and gas properties in California, subject to an excepted and retained production payment on certain of the properties, and an undivided one-half interest in Honolulu's Alaskan properties. A group of four corporations purchased from Honolulu the excepted and retained production payment.

New Overseas Firms

The following have filed articles of incorporation with the corporation dept. of Secretary of State's office in Dover, Del.: Mid American Natural Gas Corp. lists $100,000 authorized capitalization to deal in metals and mineral substances. Incorporators are Wm. Seegraber, Thomas Seward, and Rolf Wisness—all of New York city. Registrar & Transfer Co., Dover, Del., is serving as principal office. Helis Overseas Inc. lists authorized capital stock of 1,000 shares of no par value to engage in oil, gas, and mineral business. Corporation Trust Co., 100 West 10th St., Wilmington, Del., is serving as principal office. United Overseas Production Corp. lists authorized capital stock of 100,000 shares of no par value to engage in the oil business. Incorporators are Wm. Staplin, Summit, N. J.; Clifford Root, Port Chester, N. Y.; and Robert Gifford, Ridgewood, N. J. United States Corporation Co., Dover, Del., is serving as principal office.

Canadian Oil Expenditures

The Canadian Petroleum Association recently completed a historical survey of expenditures made by all companies involved in the exploration and development of oil and gas resources in Western Canada. The period 1947 to 1960 represents the formative stage in Western Canada oil and gas development and it is significant to note that expenditures increased over this period from 31 million dollars in 1947 to 620 million in 1960. The year 1957 still remains as the peak year when a flurry of activity followed on the heels of the Suez crisis. Large capital expenditures on natural gas facilities during 1961 will, in all probability, push 1961's expenditures to an all time record.

Alberta continues to represent in excess of three-quarters of total Western Canada expenditures. 1957 was the peak year in Saskatchewan but since, there has been a steady decline in this province. With an anticipated increase in British Columbia expenditures this province should rank second to Alberta in 1961, a position which Saskatchewan has held since 1947.

The Canadian Petroleum Association will conduct this survey each year commencing with a review of the 1961 industry expenditures some time early in the new year.

Giant Valves for Foreign Pipeline

An order for 23 "Flo-ball" valves, weighing between three and four tons each, for a foreign petroleum pipeline application, is being completed by Hydromatics, Inc., Bloomfield, N. J. The valves were designed to operate efficiently with minimum maintenance under extremely high ambient temperatures. Electric motor actuators will operate the valves on a remote signal. Made of carbon steel, the valve's "Flo-ball" weighs up to 3,000 lb, according to the size of the valve openings, diameters of which range from 12 to 20 inches.

Dresser Appoints UK Licensee

Appointment of G & J Weir, Ltd., Glasgow, Scotland, as a licensee, has been announced by Elmer J. Weis, executive vice president of Pacific Pumps, Inc., a division of Dresser Industries, Inc.

The license and technical assistance agreement negotiated through Dresser A.G., international representative of Dresser Industries, Inc., calls for Weir to manufacture and market centrifugal pump products of Pacific Pumps, Inc. design. The new affiliation will be known as Weir-Pacific Pumps, with sales offices based in London, Glasgow, and all other key industrial centers throughout the United Kingdom.

New Lucey International Corp.

The formation of a new foreign division and an affiliated foreign company to handle world-wide sales of Lucey Products Corp, has been announced. The new division, which will headquarter in Tulsa to handle sales of materials and equipment in the USA for shipment to foreign countries, will be known as Fraber International Co. The new company, Fraber-Lucey Corp., will have offices in Europe and will be affiliated with Lucey Products Corp. for the sales of equipment between foreign countries.

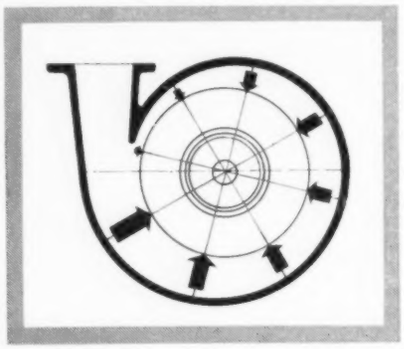
Shell Expects 5% Rise

Shell Oil Co.'s 1961 net income is forecast to rise to about $150 million ($2.50 per share), up from $144.5 million ($2.39 per share) in 1960. If favorable weather prevails, 1961 revenues could rise 5% from Shell's $1.8 billion in 1960. Mild weather in the fourth quarter, of course, would restrict fuel-oil sales.

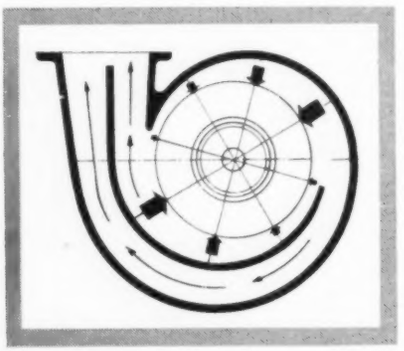
World Tanker Freight Rates

The weighted average world tanker freight rate assessments of the London Tanker Brokers' Panel as at October 1, are announced as follows: general purpose vessel (13,500 to 24,999 dwt)—Scale No. 3 minus 6.1%; large vessel (25,000 dwt and over)—Scale No. 3 minus 14.9%. This indicates increases of 1.4% on the general purpose vessel assessment as at July 1, and of 1.0% on the large vessel. In terms of a voyage from the Netherlands Antilles to London, this represents rises of 5½d and 4d per ton, respectively.

Why HYDRAULIC RADIAL BALANCE makes so much difference to the life of a centrifugal pump



See how the outdated single volute construction promotes uneven pressure around the periphery of the impeller, causing excessive bearing wear, excessive maintenance, excessive costs !



Double volute construction of David Brown 'Bingham' Pumps ensures equal pressures on opposite sides of impeller, giving hydraulic radial balance. Result—long life, infrequent maintenance.

'Bingham' double volute centrifugal pumps

—cast, machined, assembled, tested under one roof by

DAVID BROWN

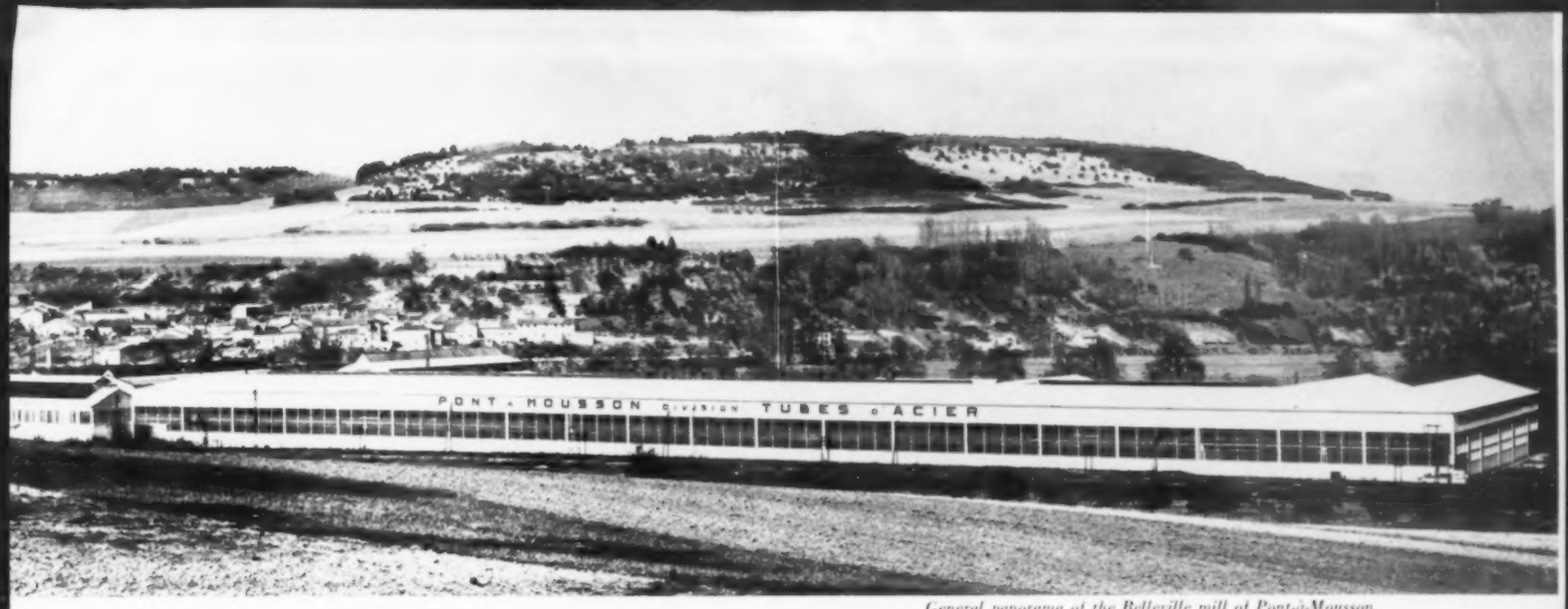
An alliance of engineering specialists in gearing, machine tools, castings, automobiles, and agricultural tractors and machinery.

THE DAVID BROWN CORPORATION (SALES) LIMITED

PUMPING CORROSIVES?

The resources and experience of the David Brown metallurgical laboratories are at your disposal.

FOUNDRIES DIVISION PENISTONE NR. SHEFFIELD Telephone Penistone 3311



General panorama of the Belleville mill of Pont-à-Mousson.

"FRENCH STEEL PIPE INDUSTRY EXPANDS AS NORTH AFRICAN CRISIS SPEEDS GROWTH"

The booming French steel pipe industry, already taking giant strides as the Sahara yields new oil potential, got new impetus in spite of the North African crisis.

Following the outbreak of violence in Bizerte in July, the Tunisian government cut the oil flow from Edjeleh. In response, French petroleum interests decided immediately to construct a new pipe line connecting the C.R.E.P.S. eastern Sahara fields with the existing pipe lines that run through Ohanet and Hassi Messaoud, and thence to the Mediterranean.

The project had been on the drawing board, but scheduled for the indefinite future. The Tunisian flare-up, within the span of a few hours, brought the decision to get the work under way without delay.

Urgent orders were placed in early September with the Belleville Plant of the Société des Fonderies de Pont-à-Mousson, a major French pipe and tube manufacturer which at this time was supplying pipe for the eastern European pipeline complex "Lavera-Strasbourg."

The firm's production team were asked if the short delivery dates for the huge order could be met. Back came the response: "Can do!". This confident answer is typical of the production power and resources of the steadily growing French steel pipe industry. For example, the Belleville plant which makes welded pipe is but one division of the Société des Fonderies de Pont-à-Mousson. Internationally known, Pont-à-Mousson is a major holding Company with extensive interests in coal mining, steel mill and pipe foundries, in addition directs pipe-laying and construction companies in 15 other countries. Its specialization in steel pipe and tube manufacture and construction has won it a special international recognition as a major supplier of facilities for volume transport of petroleum and gas by pipeline.

In the Common Market, Pont-à-Mousson controls the HADIR Company which manufactures small diameter welded pipes in Luxembourg; in Germany, the Halberghütte Company for oil pumps and compressors; in France and in the oil and gas fields, PONT-A-MOUSSON directs—through its subsidiary SIDELOR—, the seamless steel-pipe plant at Déville-les-Rouen, the most modern mill in Europe. This plant manufactures all sizes of seamless steel pipes from 1/3" to 10 3/4" in all grades of steel recognized by the American Petroleum Institute. Ductile iron pipes, used by a majority of French Tanker fleet, were first manufactured in Europe by the PONT-A-MOUSSON complex. In welded pipe the production line at the Société des Fonderies in Belleville provides tubes from 16 to 42", generally in X 52 steel, and also in other grades of steel if necessary.

Belleville additionally finds itself working with many special orders. For example, boiler pipes with diameters up to ten feet.

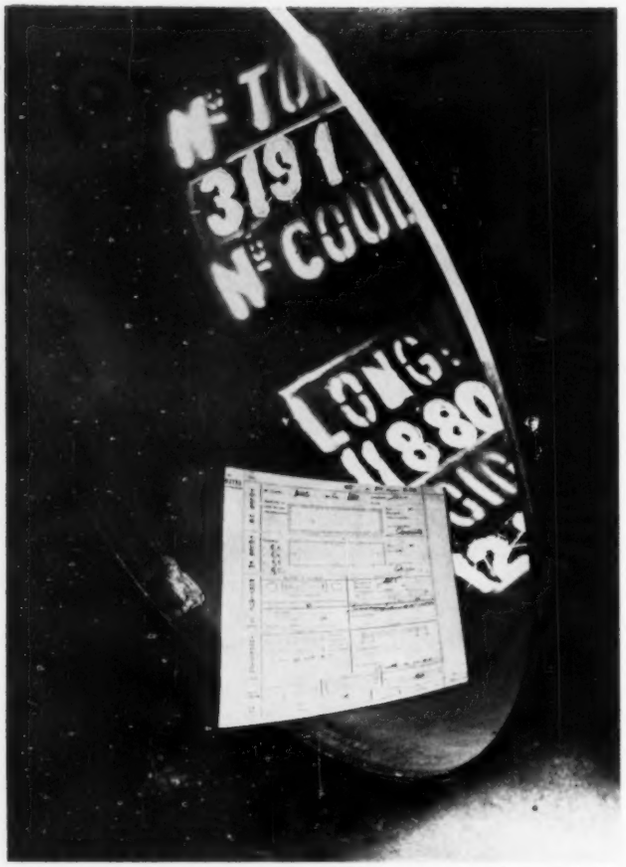
The plant at Déville-les-Rouen for seamless steel pipes is modelled after American prototypes. However, the Belleville mill follows the successful patterns established in other Pont-à-Mousson plants in Europe.

The plant's modern Research Center guided the selection of the special steel for the cross-Mediterranean pipeline. A major pipe-laying Company of the Group: EAU et ASSAINISSEMENT—SOCOMAN is closely studying applications in this particular field.

Of necessity, much production equipment on the pipe production line at Belleville is originally designed. It employs a high degree of automation and the long steel plates are folded, curved in a "C" shape then pressed in the final "O" before welding with remarkable facility. The inner welding is controlled on a TV screen filmed by the camera's lens at the welding head. Outside welding is done under the guidance of a light signal, also with automatic ease. Both ends of the tube are then cut with a blow torch and then hydraulically expanded into final shape. The final operation—end facing and bevelling—follows and a pipe is born.

The plant is equipped to provide the various protective coating processes, inner and outside, to customer specifications. Unusual

Advertisement



Précise quality control by the specific identity card which follows each tube through the production line and on which is noted specifications and control test data.

mechanical and boiler shaping equipment are also part of the plant's facilities. Rigid inspections afford good quality control, and out of one 60-employee shift, as example, 18 persons are engaged in quality control operations. Inspectors wear green uniforms to distinguish them from the production men wearing blue. Total output of this one 60-man crew per shift is roughly one mile of steel tubes. Each control point finds several inspectors who select tubes at random from each run of 50 tubes. These samples undergo a rigorous pattern of tests designed to confirm tensile strength, welding efficiency and the stress placed on the metal by the folding and bending operations. These tubes are of course deleted from the production run, but serve their purpose in affording a constant spot check of the production run.

On reaching the inspection shop, the steel plate is subjected to a wide range of tests: ultrasonic, various and special measurements. The tube is identified, marked and then gets its "identification card" which stays with it right up to finishing point .

Following the welding operation, the tube again undergoes ultrasonic examination. Even slight faults call for an X-Ray and eventual return for semi-automatic repair. The final test during production is hydrostatic pressure control, following expansion of the tubes according to A.P.I. specifications.

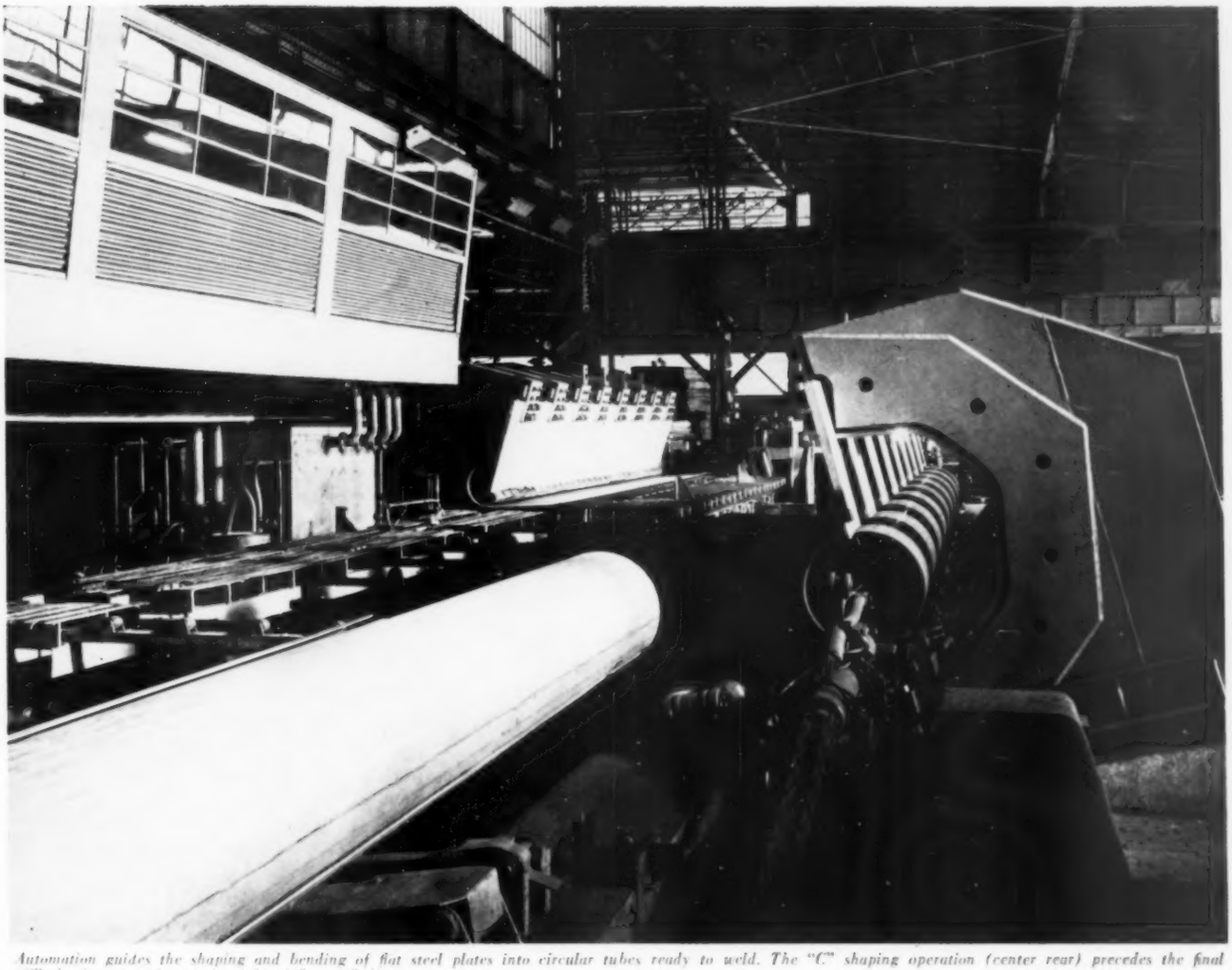
M. PIERSON, Plant Alternate Manager states that "It is barely possible that a defective tube might leave our plant but hardly probable."

Even after the tube is finished, another series of inspection operations begins: the ultra-sonic welding test, using still more sensitive testing equipment, then systematic X-Rays for *all* tubes and, finally, special testing of doubtful spots disclosed during ultra-sonic tests. Dimensional inspection also takes place before delivery of the tube.

"As a matter of fact, the Official A.P.I. certificate which hangs

New testing methods utilizing advanced ultra-sonic techniques are applied for the second time to welding points prior to final X-Ray control.

Advertisement



Automation guides the shaping and bending of flat steel plates into circular tubes ready to weld. The "C" shaping operation (center rear) precedes the final "O" shaping operation at the right (16" to 42" dia.).

in my office is a continuing challenge to us not only meet the basic approved API standards, but also to surpass them in many cases."

These strict control standards have paid off, and have won the respect of foreign competitors. "American or Russian Technicians who visited our plant have been greatly impressed by the extent and quality of our controls" adds Plant Manager, Monsieur SOGNET.

Mr. CLEMENTZ, a director of the SOCIETE des FONDERIES de PONT-A-MOUSSON said also: "We try to keep inspection measures at peak efficiency. Perhaps as a result our tubes are found on all lines constructed in the Sahara and in France since 1957, when our production first started. Also, and this is equally important, we keep our prices competitive.

"As an important link in the chain of Companies involved in pipe work productions under the PONT-A-MOUSSON Label, the welded pipe Plant at Belleville should play a major role in the petroleum and gas industry. Indeed we are awaiting a considerable expansion of pipe transportations especially in the oil, gas and raw and finished product categories."

PONT-A-MOUSSON
MAIN OFFICES

PARIS 24, rue de Prony (17e)—NEW YORK Pontex Pipe Corp. 116, John St., Suite 1317, New York 38, N. Y.—SAO PAULO Rua Marconi 131 (7 andar)—MEXICO DF Apartado 1014 Monterrey 29—BUENOS AIRES Calle Peru 263, (7e piso)—BEYROUTH P.O.B. 3359—BANGKOK P.O.B. 280.

Advertisement

ANNOUNCEMENT

The following announcement is made by virtue of the powers vested in the Ministry of Finance by Order No. 1, of 1943, as amended.

1. The areas situated within the boundaries of District 1 and District 2 as described below are declared as "open" for the submission of proposals for the award of petroleum concessions therein for a period of three (3) months from 5th Dec., 1961 ("zero date").

2. (a) Boundaries of District 1:

Commencing at the intersection of latitude 16° North and longitude 41° 20′ East; thence South along longitude 41° 20′ East in a straight line to the intersection of latitude 14° 45′ North and longitude 41° 20′ East; thence West along latitude 14° 45′ North to the intersection of latitude 14° 45′ North and longitude 40° East; thence in a North-Westerly direction in a straight line to the intersection of latitude 15° 35′ North and longitude 39° 15′ East; thence in a North-North-Westerly direction to the intersection of latitude 16° North and longitude 39° 05′ East; thence East along latitude 16° North to the point of origin, the area enclosed in said boundaries being approximately 27,500 square kilometres in area.

(b) Boundaries of District 2:

Commencing at the intersection of latitude 18° 10′ North and longitude 38° 45′ East; thence in a South-South-Easterly direction to the intersection of latitude 17° 12′ North and longitude 39° 14′ East; thence East along latitude 17° 12′ North to the intersection of latitude 17° 12′ North and longitude 39° 41′ East; thence South-East in a straight line to the intersection of latitude 16° North and longitude 41° 20′ East; thence West along latitude 16 North to the intersection of latitude 16° North and longitude 39° 05′ East; thence North-North-Westerly in a straight line to the intersection of latitude 17° 30′ North and longitude 38° 40′ East; thence North-North-Westerly in a straight line to the border between the Empire of Ethiopia and the Republic of Sudan; thence along said border to the coast of the Red Sea; thence in a North-Easterly direction in a straight line to the point of origin; the area enclosed in said boundaries being approximately 27,000 square kilometres in area.

3. Any company ("applicant company") desiring to submit a proposal or proposals looking to the award of a concession covering either or both of the Districts described above shall notify the Ministry of Mines in writing. Upon said notification, and against payment of U.S. $1,000 for each District with respect to which requested, the applicant company shall be furnished with all documents required to permit the preparation of a proposal, including a form of Contract of Concession, and instructions relating to the procedure to be followed in submitting proposals, and other documents. In addition, information as to exploration activities already carried on within each such District shall be made available to the applicant company.

4. Prior to ("zero date plus three months") proposals may be filed by the applicant company in accordance with the prescribed procedure. All proposals filed before (above date) shall be deemed to be filed simultaneously but shall not, however, create or vest any right in the applicant company the Imperial Ethiopian Government reserving full right to reject any and all proposals received without cause.

5. All proposals shall be opened in public on ("zero date plus three months and one day").

Address:—

Ministry of Mines
P. O. Box 486
Addis Ababa.
Ethiopia.

Ministry of Mines
Imperial Ethiopian Government.

HERCULES

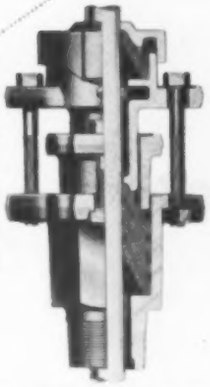
CONE PACKED STUFFING BOXES

For general service Hercules Stuffing Boxes are constructed from malleable iron. For service on wells with corrosion or electrolytic conditions, Hercules Stuffing Boxes are available made from other test-proven metals.

PREFERRED for 34 years by Experienced Oil Men

HERCULES REGULAR TYPE DUPLEX STUFFING BOX

More efficient operation with fine adjustment possible. Offers longer packing life due to ability of Packing and Glands to follow lateral movement of Polished Rod. Malleable iron construction prevents breakage if rods are accidentally dropped on Stuffing Box. Has male thread to screw into Pumping Tee.

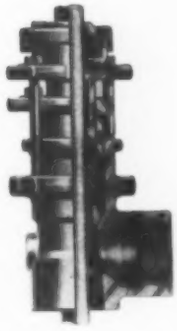


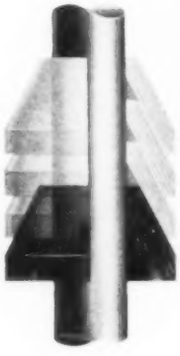
HERCULES OIL RESERVOIR GLAND

All Hercules Stuffing Boxes may be equipped with *Oil Reservoir Upper Glands* for *problem* wells which pump off and burn packing. The polished rod runs through the Reservoir, and is cooled and lubricated by its fluid.

HERCULES TEE TYPE DUPLEX STUFFING BOX

A combination Tee and Stuffing Box only 15" high. Eliminates one threaded connection between Stuffing Box and Tee. Full opening—allows rods to be run or pulled without removing Stuffing Box body. Has female thread to screw directly onto tubing.



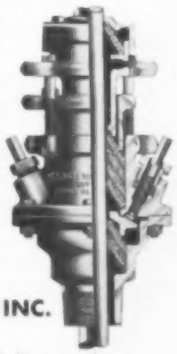


HERCULES CONE-SHAPED PACKING RINGS

Each set of rings contains a solid ring as the bottom one. This provides greater contact with the polished rod and a more substantial base for the upper ones. This results in *longer* packing life and superior performance. A complete set consists of three *regular* and one *bottom* ring.

HERCULES TYPE DP (Double Packed)

Duplex Stuffing Box for use on high pressure or intermittently flowing wells. Allows Main (upper) Packing to be safely and easily replaced while well is under pressure. The two compression bolts (A) are turned clockwise until the lower Packing seals off. The Main Packing can then be removed and replaced.



HERCULES PRODUCTS ARE AVAILABLE THROUGH ALL SUPPLY STORES

Write for Literature on items on which you desire complete information.

HERCULES TOOL COMPANY

Manufacturers of Oil Field Equipment

GENERAL OFFICES AND PLANT • TULSA, OKLAHOMA

Export Representative Oil Field Equipment Co., Inc. 90 West Street, New York, N. Y.

Export Representative:

OILFIELD EQUIPMENT CO., INC.

T. E. Ward, Jr., President

90 WEST STREET, NEW YORK 6, N. Y.

New GeoData Corp.

GeoData Corp., a new company, with home office in the Thompson Bldg., Tulsa, Oklahoma, has been established. Its primary purpose is to provide geological and geophysical data on both a domestic and international basis to petroleum companies and interested parties at a mere fraction of the cost of an original survey. GeoData came into being through the purchase of over 30,000 shotpoints consisting of 216 individual propects in ten different states. GeoData has rapidly expanded its initial coverage and now has available, either on a sale or trade basis, geophysical and geological information with an estimated replacement value of at least $20,000,000.

Ben F. Rummerfield, president of GeoData, emphasizes the fact that GeoData Corp., is operating with the blessing and the support of many major oil companies—all GeoData (i.e. geological and geophysical information) has been and will be acquired "with the full knowledge and consent of all parties concerned." Rummerfield points out that oil finding costs in the Mid Continent of the USA have soared from $1.29 per barrel in 1946 to $3.30 per barrel today.

Oasis Oil Contract to Dresser

Dresser Electronics, SIE Division, has received a control system responsibility contract from the Oasis Oil Co. of Libya. Equipment to be furnished under the contract will be used for control of the Oasis 30-inch, main pipeline of the Sidrah Pipeline System. This line, designed for a flow capacity of 300,000 b/d, delivers crude from Dahra to a tank farm at Es Sider. Delivery is made from the tank farm to a loading area several miles away. Line flow from Dahra to the tank farm operating center for the system will be at the loading area with communication to the tank farm by physical pairs. A microwave link completes the system to Dahra. The Dresser/SIE supervisory control and telemetering will be performed over tone carriers in the microwave base band. Delivery of the system is scheduled for early next year.

Creole Places Large Order

Creole Petroleum Corp. has placed a $450,000 order with International General Electric (IGE) for electrical drive equipment for the first full-scale water-flood project on oil-rich Lake Maracaibo in Venezuela.

IGE will supply eight 1,500-hp induction motors for driving the water injection pumps, plus eight 2,000-kva transformers and eight switchgear controllers. The order also includes two 7,500-kva transformers and four metal-clad switchgear equipments to feed the distribution system.

New Line of Gate Valves

Newest valves in the Lunkenheimer line are described in a new, two-page circular, No. 637, "Lunkenheimer Small Steel Gate Valves." These new valves have screwed or socket ends, available in a bolted bonnet design in 1½ and 2 inch sizes, and in a union bonnet in sizes ¼ through 1 inch. An inside-screw rising stem, solid-wedge disc, and rolled-in seat rings are features of the valve. Valves are rated 800 lbs.—850F and 2,000 lbs.—100 F. Copies of the new circular No. 637, can be obtained from the Lunkenheimer Co., Box 360, Cincinnati 14, Ohio.

Schlumberger Acquires Solartron

Schlumberger Well Surveying Corp., a wholly-owned subsidiary of Schlumberger Ltd., both with headquarters in Houston, Texas, and Firth Cleveland Ltd., of London, England, have agreed that Schlumberger Well Surveying Corp. will acquire Firth Cleveland's 56.7% holdings in The Solartron Electronic Group Ltd. for a cash consideration of £ 1,927,940 ($5,429,272). The Solartron Electronic Group Ltd. is a closely held English company in the field of electronics and instrumentation.

New Metering Pump

A descriptive bulletin on the new Beckman Solution Metering Pump is available from the Scientific and Process Instruments Division of Beckman Instruments, Inc. The new pump is available in four ranges: 0-2, 0-5, 0-10, or 0-20 milliliters per minute. The desired flow is set in thousandths of milliliters per minute on a pre-calibrated knob, with delivery accurate to ±2% of the pump's range. Repeatability is ±0.5% of rated capacity.

A copy of the brochure, Bulletin 794, may be obtained by writing to the Technical Information Department, Beckman Scientific and Process Instruments Division Fullerton, California.

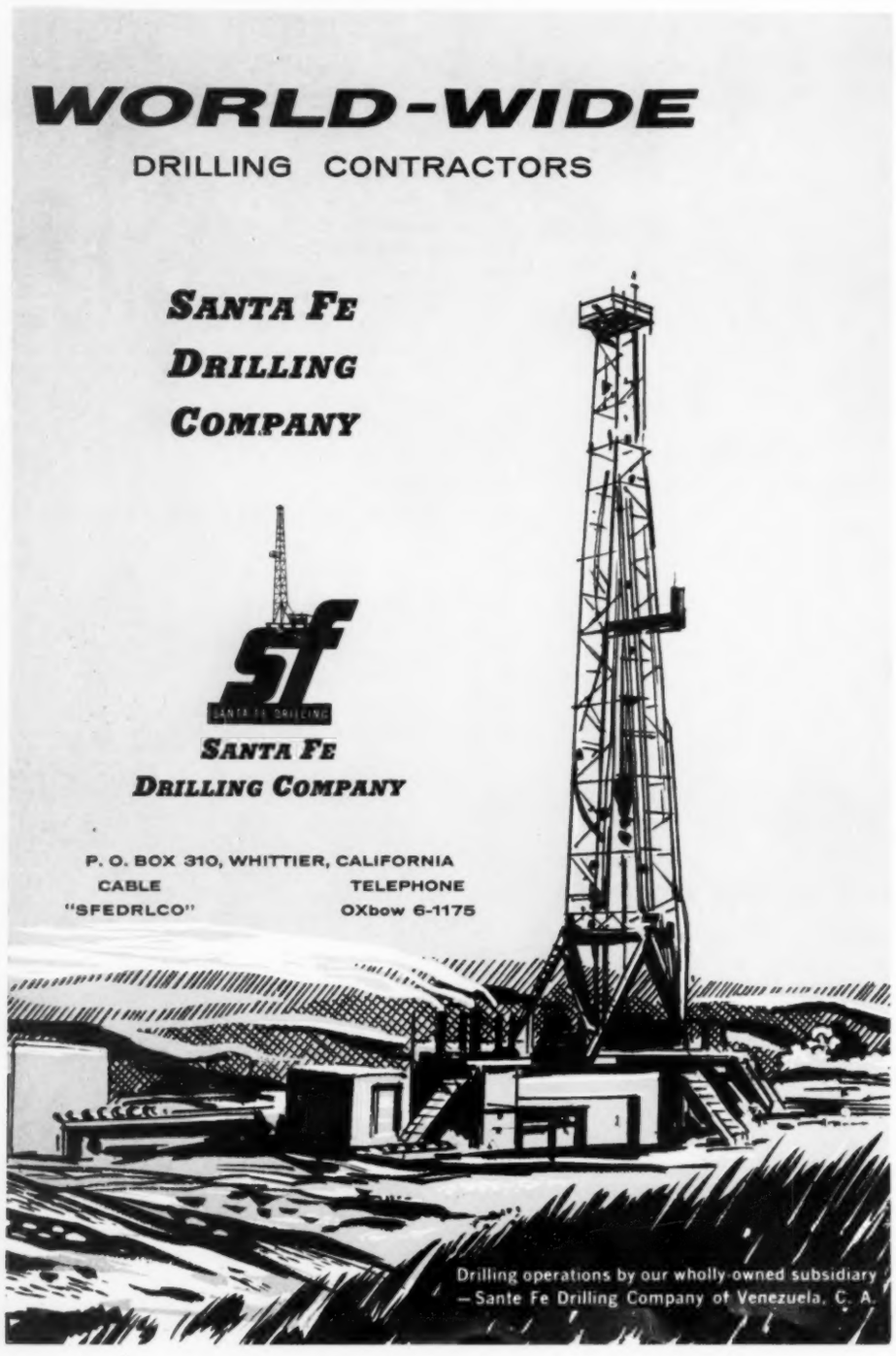
New Pacific Coast Laboratory

One of the west coast's best-equipped scientific measurement laboratories is now available to commercial users. General Precision's Librascope Division has announced that services of its metrology laboratory are being offered to electronic, petroleum, manufacturing, and other firms for calibration and repair of test and measuring instruments. Librascope's laboratory, located at company headquarters, contains more than $200,000 worth of precise electronic and optical measuring equipment.

Capabilities include electrical calibrations to an accuracy of one part in 10 million, optical angular measurements to ¼-second of an arc (2.75 millionths of an inch), and tempertaure calibrations to 1/100th of a degree.

HAROLD MOORHOUSE

Harold R. Moorhouse, executive vice president and treasurer of Arthur G. McKee & Co., died unexpectedly in Cleveland, Oct. 1. Moorhouse, who had devoted almost his entire business career to McKee, joined the organization in 1929. He served as assistant treasurer for a number of years and in 1947 was elected secretary of the company and a director. In 1953 he also became treasurer. He had served as executive vice president and treasurer since 1958. He was recently named administrative executive vice president and chairman of a newly created three-man executive committee appointed to direct operations of the large international engineering and construction firm.

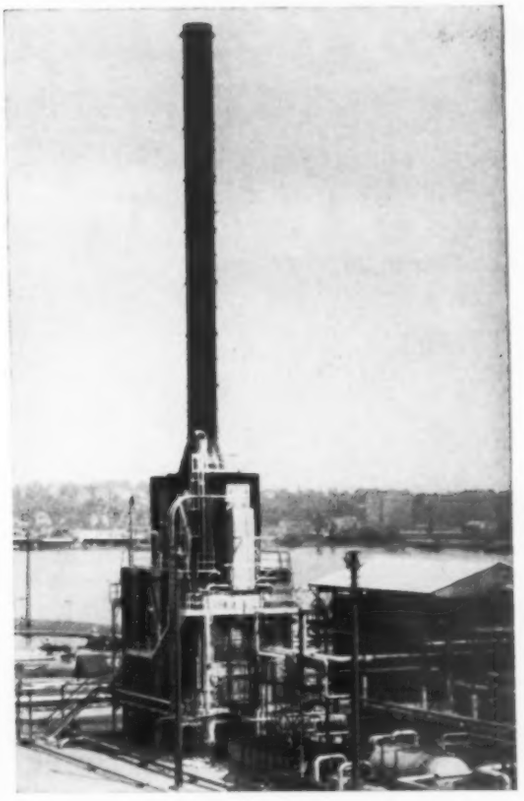


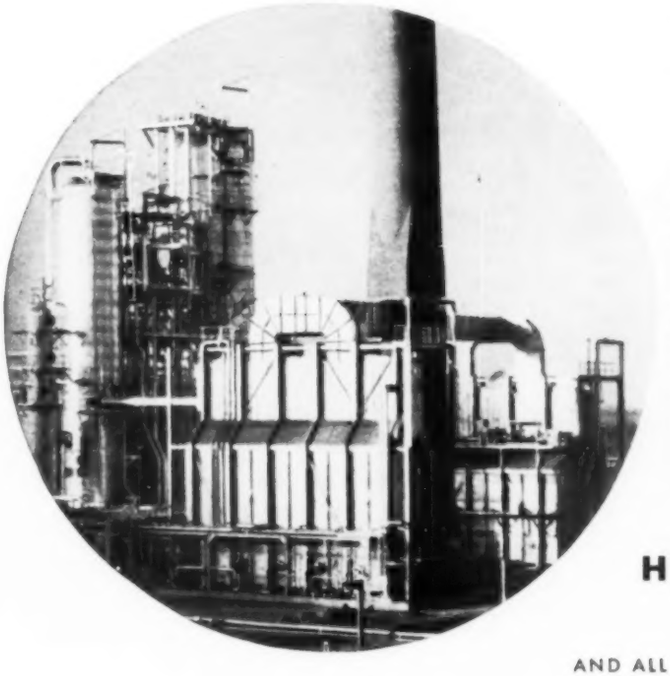
HEATERS

OF VARIOUS TYPES

FOR OIL, GAS AND PETROCHEMICAL PROCESSING

will be especially designed for your heating requirements. Updraft-, box-, cylindrical-heaters with horizontal or vertical tubes and special airheaters are at your disposal.





HEAT ENCLOSURE METHODS
SYSTEM »DETRICK«

AND ALL LININGS WITH:

- **INSULATING FIREBRICK**
- **CASTABLE REFRACTORY**
- **CASTABLE AND BLOCK INSULATION**
- **GUNNITE APPLICATION**

Many years of experience and development guarantee maximum technical standard for complete design and delivery

CLAUDIUS PETERS A.G.

HAMBURG 1 · POST-BOX 790

WODECO's economical RACKING PROCESS

SPEEDS SUB-SEA COMPLETIONS!

The secret's in the derrick !!!

When emergencies occur time saving is vital!

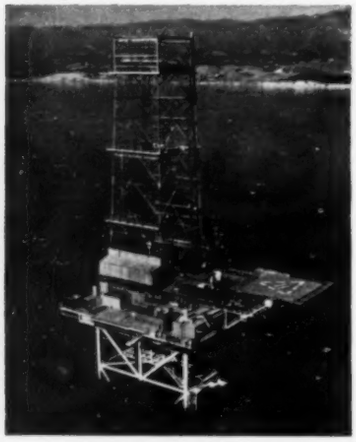
Here's why *faster, safer* sub-sea completions are yours with WODECO Marine Drilling Equipment. The derrick shown at right is designed to rack 10,000 ft. of drill pipe in 60 ft. stands, *a tremendous time advantage in trip time.* Handling of drill pipe, especially drill collars, risers and B.O.P. assemblies, by standing back in the derrick also provides significant time savings over competitive floating vessels employing a conventional deck pipe rack only.

This is *only one phase* of Sub-Sea and Offshore Drilling where WODECO can provide *great savings.* WODECO supplies equipment, trained crews, and experienced supervisor personnel for *world-wide* marine operations. Since 1950 WODECO and HANEY-WILLIAMS DRILLING COMPANY have operated in the United States, Mexico, Uraguay, Brazil, Ecuador, and Alaska. WODECO Offshore Drilling Contractors *are specialists in exploratory drilling and sub-sea completions from floating vessels.*

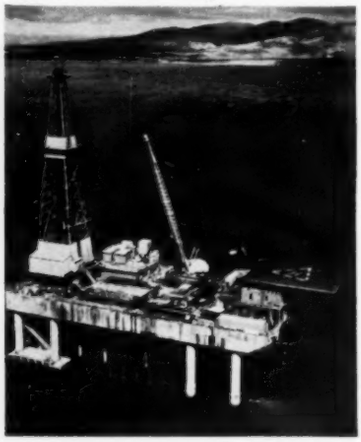
SPECIAL FEATURE! Provisions for helicopter transportation used on all offshore equipment . . . *for emergency and less rig time loss, also an important safety feature!*

THIS 12,000 FT. DRILLING BARGE "VENMAC III" completed the *first (from a floating vessel) sub-sea oilwell* offshore from U.S.A. known as Richfield's *"The Invisible Oilwell".* Rig mounted on a 4,000 ton drilling barge. Has 108 ft. derrick. Barge is 254 ft. x 68 ft. x 18 ft. steel.

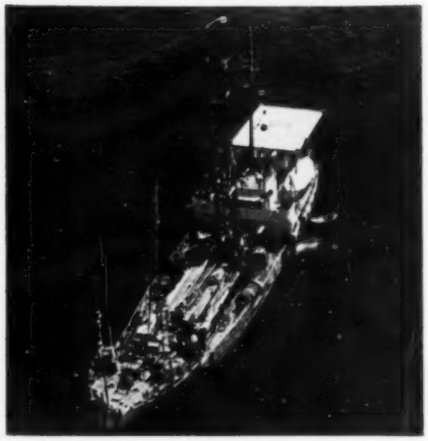
PROVISION FOR 25 WELLS on this 178 ft. fixed Standard of Calif.-Humble Oil Co. platform with 12,000 ft. *AC electric powered rig.* Permanently set in 100 ft. of water, 2.2 miles off coast in open ocean. (plus 147 ft. derrick)



Phillips Petroleum Company — Pauley et al drilling platform offshore from Pt. Concepcion, California. Original discovery from floating drill barge. Permanent platform legs drilled in by WODECO, recompletion of discovery well and development with WODECO AC electric rig.



NO TUG NEEDED for exploratory operations with the "M.V. TORRY" *which is self propelled.* Equipped with diesel slim hole rig for depths in excess of 6,000 ft. Now using 4½" Aluminum drill pipe.



WESTERN OFFSHORE DRILLING & EXPLORATION CO. (WODECO)

A Subsidiary of

HANEY AND WILLIAMS DRILLING CO.

21 years of drilling know-how • Long Beach, California • Telephone: GArfield 7-9481 • Cable: HAWDRIL

LET US DESIGN and CONSTRUCT YOUR NEW PROJECT

With some of the largest and best equipped design offices in Britain, the MATTHEW HALL organisation undertakes the complete engineering design, procurement and erection of oil refinery and petrochemical plants.

A SECTION OF ONE OF OUR DESIGN OFFICES

MATTHEW HALL
& CO. LTD.

OIL REFINERY & PETROCHEMICAL ENGINEERS

MATTHEW HALL HOUSE, 101-108 TOTTENHAM COURT ROAD, LONDON, W.1.,
MUSEUM 3674

A Complete Editorial Index of

WORLD PETROLEUM

Volume 32 Published in 1961

25 West 45th Street, New York 36, N. Y.

Author's Index

	Issue	Page
BAPTISTA, CESAR O.		
Mexico's Refining and Petrochemical Industry	June	53
BIBLE, JOHN L.		
Old Gravity Should Never Die	Mar	48
BRUNO, JUAN JOSE		
YPF and Argentina's Oil (Editorial)	July	41
BUSTANI, EMILE		
A Blueprint for the Middle East	Apr	40
Soviet Oil Threatens the Middle East	Feb	41
CALVERT, JAMES W.		
Offshore Technique Improving	Sept	70
CORCUERA, CARLOS L.		
Misconceptions about Mexico	Sept	50
DIAZ, EMILIO L.		
Oil Today in Argentina	July	42
DOH, C. A. (with L. A. Puzin)		
Recent Advances in Logging Techniques, the Sonic Log	Mar	45
DUCOMMUN, J. C.		
Stop Disaster! Major Goal of Newest API Committee	Apr	48
ELTHAM, ERIC		
The Fuel Cell—Promise of Threat to the Oil Industry?	Nov	73
GAITHER, ROSCOE B.		
Mexico's Oil Laws	June	76
GESS, KAROL N.		
Oil—New Africa and Old Concessions	Feb	48
GIRELLI, ALBERTO		
Italian Refining Continues Climb	Refg.	46
GUTHRIE, V. B.		
New Uses, Wider Markets Open for Old, Established Products	Nov	66
The Outlook for USA Petroleum Demand—1961	Jan	43
GUTIERREZ, PASCUAL ROLDAN		
Oil Is Vital to Mexico	Sept	42
HEINEMANN, HEINZ (with P. A. Lefrancois)		
Annual Review of USA Patents on Petroleum Refining and Processing	Refg.	53
Review of Recent USA Patents on Catalysts	Mar	68
HENDERSON, G. R. (with John E. Miller)		
Contract Maintenance in Canada	May	72
HOWELLS, W. C.		
Canada's Oil and Gas Industry Now Faces Major Challenge (Editorial)	May	39
HUTTLINGER, JOSEPH B.		
U.S. Oil Import Controls—Good or Bad?	July	54
Washington Pipeline: all issues, page 4		
ISHII, MASAYA		
Oil Will Supply Two-Thirds of Japan's Energy by 1980	Refg.	48
JUTRAS, J. R.		
How a Computer Is Used to Plan Refinery Operations	Jan	54
LAMASSE, JACQUES C.		
France's Refining Capacity Will Increase 25% by 1963	Refg.	44
LANDAU, RALPH		
Recent Trends in Aromatic Chemicals from Petroleum	Apr	56
LEFRANCOIS, P. A. (with Heinz Heinemann)		
Annual Review of USA Patents on Petroleum Refining and Processing	Refg.	53
Review of Recent USA Patents on Catalysts	Mar	68
LONG, AUGUSTUS C.		
International Oil—Its Ills and Cures	Jan	37
MASCANZONI, BRUNO (with F. X. Peredo)		
Pipeline Systems of Pemex	June	48
MATTEI, ENRICO		
ENI Operates World-Wide	Feb	37
MAZO, RICARDO		
Paraguay Invites Oil Help	Dec	47
MENA, RAFAEL ORTIZ		
Coordinating Pemex	June	60
MILLER, JOHN E. (with G. R. Henderson)		
Contract Maintenance in Canada	May	72
NELSON, ALAN C. (with Preston P. Nibley)		
Economics of Oil Transportation—Middle East to Western Europe	Nov	56
NIBLEY, PRESTON P. (with Alan C. Nelson)		
Economics of Oil Transportation—Middle East to Western Europe	Nov	56
OSPINA-RACINES, E.		
Colombia Oil Looks Up	Dec	36
PARRA, FRANCISCO R.		
A Role for OPEC	Aug	28
PEREDO, F. XAVIER (with Bruno Mascanzoni)		
Pipeline Systems of Pemex	June	48
PUZIN, L. A. (with C. A. Doh)		
Recent Advances in Logging Techniques, the Sonic Log	Mar	45
RASSMUSS, JUAN		
Bolivia Spurs Activity in Western South America	Dec	40
RATHBONE, M. J.		
Needed—More Understanding (Editorial)	Nov	45
REED, GORDON W.		
Russia's Oil Drive	Sept	54
ROJAS, ANTONIO GARCIAS		
Mexico's Exploration Grows	June	42
ROWLAND, LESLIE ORR		
Natural Gas Dominant Factor in Canada's Petroleum Future	May	45
SCOTT, J. W.		
Austria's Petroleum Industry	Aug	40
SHERWOOD, PETER W.		
Air Oxidation of Cyclohexane	Nov	78
New Markets Revive Petrochemical Propylene Oxide and Glycol	June	66
New Technology Boosts Markets for Petrochemical Toluene	Oct	56
SIEVWRIGHT, ERIC C.		
Canada's 1960—the Year of Gas	May	41
SOBOTKA, RUDOLF		
Eastern European Process Plants Start Big Upswing	Refg.	50
New Austrian Refinery Now Onstream at Schwechat	Aug	38
STAHMER, ALFRED M.		
Refining Capacity Continues Growth in West Germany	Sept	64
UHL, WILLIAM C.		
Alberta's New Condensate Refinery Makes Visual Impact on Public	May	58
Boom in Canada's Processing Centers on Gas and Sulfur	May	48
Growing Impact of the Compacts on Motor Fuels in the USA	Jan	52
How to Revamp a Cracking Unit during a Turnaround	Refg.	60
Processing Review: Jan, p. 20; Feb, p. 28; March, p. 74; Apr, p. 32; May, p. 34; June, p. 28; July, p. 34; Aug, p. 54; Sept, p. 30; Oct, p. 64; Nov, p. 36; Dec, p. 28		
World Refining Will Increase 31% by 1965, to 32.3 million barrels daily	Refg.	40
VAN MIDDLESWORTH, NEAL		
Venezuela's Oil Decline	Mar	39
WALDIE, ALAN D.		
Weight Dropping in North Africa	Apr	47
WOOD, CECIL W.		
London Letter: Jan, p. 8; Feb, p. 10; March, p. 10; April, p. 10; May, p. 8; June, p. 8; July, p. 8; Aug, p. 10; Sept, p. 8; Oct, p. 10; Nov, p. 10; Dec, p. 8		
Milford Haven, Newest Refinery in the UK, Now Onstream	Feb	50
The UK Oil Industry—1960	Jan	45
UK Process Projects Emphasize Petrochemicals	Refg.	42
WOODS, J. P.		
Reserves and Exploration (Editorial)	Mar	35
YOUNES, MAHMOUD		
The Future of Suez	Apr	38

Subject Index

(NOTE: Covers major articles only, and does not include articles in the WORLD PETROLEUM REPORT—1961, which will be found only under the Geographical Index.)

	Issue	Page
ASSOCIATIONS		
Sixth World Petroleum Congress	Dec	39
Stop Disaster!—Major Goal of Newest API Committee, by J. C. Ducommun	Apr	48
The API Meets in Chicago	Nov	51
AUTOMATION		
How a Computer Is Used to Plan Refinery Operations, by J. R. Jutras	Jan	54
AUTOMOTIVE		
Growing Impact of the Compacts on Motor Fuels in the USA, by William C. Uhl	Jan	52
Exploration		
AFRICA		
ENI Operates World-Wide, by Enrico Mattei	Feb	37
Libyan Turnbacks Watched	Feb	42
Oil—New Africa and Old Concessions, by Karol N. Gess	Feb	48
Oil Search in the Spanish Sahara	Nov	52
Problems in Libya	Apr	44
Rebels and Oil in Algeria	Apr	42
Weight Dropping in North Africa, by Alan D. Waldie	Apr	47
CONCESSION AGREEMENTS		
How Much Is Too Much? (Editorial)	Jan	35
Libyan Turnbacks Watched	Feb	42
Oil—New Africa and Old Concessions, by Karol N. Gess	Feb	48
Pan American Operations Reach Peak (in Argentina)	July	47
Paraguay Invites Oil Help, by Ricardo Mazo	Dec	47
Problems in Libya	Apr	44
Rebels and Oil in Algeria	Apr	42
Venezuela's Oil Decline, by Neal Van Middlesworth	Mar	39
DRILLING		
Bolivia Spurs Activity in Western South America, by Dr. Juan Rassmuss	Dec	40
Canada's Exploration—1960	May	52
Colombia's Oil Looks Up, by E. Ospina-Racines	Dec	36
Drilling Progress by Southeastern (in Argentina)	July	56
High Hopes in Tierra del Fuego (in Argentina)	July	44
How Air and Gas Drilling Cut Costs at Two Foothills Wells (in Canada)	May	68
International Rig Report Hits Peak	Aug	33
Link Reports on Brazil	Mar	36
Maple Discovery Aids Brazil's Exploration	Dec	45
Offshore Technique Improving, by James W. Calvert	Sept	70
Oil Is Vital to Mexico, by Pascual Gutierrez Roldan	Sept	42
Pan American Operations Reach Peak (in Argentina)	July	47
Paraguay Invites Oil Help, by Ricardo Mazo	Dec	47
Recent Advances in Logging Techniques, the Sonic Log, by C. A. Doh and L. A. Puzin	Mar	45
Shell's Exploration Pushed (in Argentina)	July	52
EUROPE		
Austria's Petroleum Industry, by J. W. Scott	Aug	40

(Continued on page 90)

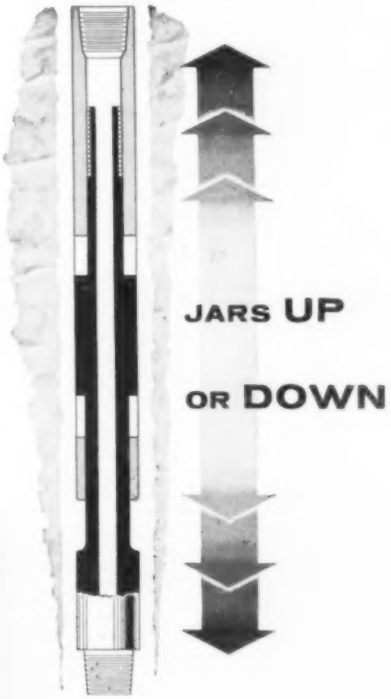
McCullough
double-acting
rotary jars

CHECK THESE FEATURES

- Will strike a feather touch or up to 100-ton metal-to-metal blows.
- Force of blow controlled by operator at surface.
- Jars up or down at will of operator.
- Ideal for washover operations.
- Consistently used with all makes of testers.
- Most rugged, reliable Jar available.
- Most widely used Jar in foreign operations.
- Very little maintenance required.
- Packed for high pressure.
- As shown at right, has only four parts (2 major jarring elements)—no slip dogs nor hydraulic mechanisms to fail; no threaded joints to unscrew.

For complete information write for Bulletin No. 501—McCullough Tool Company, 5820 South Alameda St., Los Angeles 58, California. Cable Address: Mactool.

Improvement in McCullough Jars adds 97% to jarring surface areas—gives greater strength and increases service life.



CONTROLLED POWER
for every jarring operation

McCullough®
TOOL COMPANY
Los Angeles • Houston • Edmonton
Cable Address: Mactool
Service ANYWHERE ANYTIME

(*Continued from page 88*)

Issue Page

ENI Operates World-Wide, by Enrico Mattei ..... Feb 37
French Seismograph Developments ..... Mar 60

GEOLOGY
Arctic Piercement Structures ..... May 67
Link Reports on Brazil ..... Mar 36

GEOPHYSICS
Canada's Exploration—1960 ..... May 52
Free World Geophysical Activity—1960 ..Aug 32
French Seismograph Developments ..... Mar 60
New Tools, for the Geophysicist ..... Mar 49
Old Gravity Should Never Die, by John L. Bible ..... Mar 48
Weight Dropping in North Africa, by Alan D. Waldie ..... Apr 47

LATIN AMERICA
Bolivia Spurs Activity in Western South America, by Dr. Juan Rassmuss ..... Dec 40
Colombia Oil Looks Up, by E. Ospina-Racines ..... Dec 36
Disaster in Brazil (Editorial) ..... Feb 35
Drilling Progress by Sountheastern (in Argentina) ..... July 56
High Hopes in Tierra del Fuego (in Argentina) ..... July 44
Link Reports on Brazil ..... Mar 36
Mapele Discovery Aids Brazil's Exploration ..... Dec 45
Oil Today in Argentina, by Emilio L. Diaz ..... July 42
Pan American Operations Reach Peak (in Argentina) ..... July 47
Paraguay Invites Oil Help, by Ricardo Mazo ..... Dec 47
Shell's Exploration Pushed (in Argentina) ..... July 52
Venezuela's Oil Decline, by Neal Van Middlesworth ..... Mar 39

MAPS (see also under Marketing)
Canada's Exploration—1960 ..... May 52
High Hopes in Tierra del Fuego (in Argentina) ..... July 44
Libyan Turnbacks Watched ..... Feb 42
Link Reports on Brazil ..... Mar 36
Mexico's Exploration Grows, by Antonio Garcias Rojas ..... June 42
Pan American Operations Reach Peak (in Argentina) ..... June 47

MIDDLE EAST
ENI Operates World-Wide, by Enrico Mattei ..... Feb 37

NORTH AMERICA
Arctic's Piercement Structures ..... May 67
Canada's Exploration—1960 ..... May 52
Canada's 1960—the Year of Gas, by Eric C. Sievwright ..... May 41
How Air and Gas Drilling Cut Costs at Two Foothills Wells ..... May 68
Mexico's Exploration Grows, by Antonio Garcias Rojas ..... June 42

WORLD
Free World Geophysical Activity—1960 .Aug 32
International Rig Report Hits Peak ....Aug 33
Reserves and Exploration, by J. P. Woods (Editorial) ..... Mar 35
World Exploration Review ..... Mar 42

Marketing

AFRICA
Libyan Turnbacks Watched ..... Feb 12
Oil—New Africa and Old Concessions, by Karol N. Gess ..... Feb 48
Problems in Libya ..... Apr 44
Rebels and Oil in Algeria ..... Apr 42

CONSUMPTION & DEMAND
Canada's 1960—the Year of Gas, by Eric C. Sievwright ..... May 41
Coordinating Pemex, by Rafael Ortiz Mena ..... June 60
Europe's Energy Supply—as seen by the OEEC ..... Aug 50
Growing Impact of the Compacts on Motor Fuels in the USA, by William C. Uhl ..... Jan 52
New Uses, Wider Markets Open for Old, Established Products, by V. B. Guthrie ..Nov 66
1960 Demand 21,590,000 b/d ..... Jan 41
The Outlook for USA Petroleum Demand—1961, by V. B. Guthrie ..... Jan 43
The Pricing of Crude Oil ..... Nov 46
The UK Oil Industry—1960, by Cecil Wood ..... Jan 45
USA Product Demand Will Rise 3.2% ..Nov 70
World Oil Demand in 1961 Will Rise to over 23 Million Barrels Daily ..... Sept 46

EUROPE
Austria's Petroleum Industry, by J. W. Scott ..... Aug 40
ENI Operates World-Wide, by Enrico Mattei ..... Feb 37
Europe's Energy Supply—as seen by the OEEC ..... Aug 50
Gas Lights Europe's Hopes ..... Feb 66
The UK Oil Industry—1960, by Cecil W. Wood ..... Jan 45

EXPORTS AND IMPORTS
Economics of Oil Transportation—Middle East to Western Europe, by Preston P. Nibley and Alan C. Nelson ..... Nov 56
Future of Russian Oil ..... Sept 59
Russian Oil Exports—What to Do? (Editorial) ..... Aug 27
Russia's Oil Drive, by Gordon W. Reed ..Sept 54
The UK Oil Industry—1960, by Cecil W. Wood ..... Jan 45
U.S. Oil Import Controls—Good or Bad? by Joseph B. Huttlinger ..... July 54

FAR EAST
Oil's Important Place in Australia's Economy ..... Aug 45

LATIN AMERICA
A Role for OPEC, by Francisco R. Parra ..... Aug 28
Bolivia Spurs Activity in Western South America, by Dr. Juan Rassmuss ..... Dec 40
Colombia's Oil Looks Up, by E. Ospina-Racines ..... Dec 36
Venezuela's Oil Decline, by Neal Van Middlesworth ..... Mar 39
YPF and Argentina's Oil, by Juan Jose Bruno (Editorial) ..... July 41

LEGISLATION
A Blueprint for the Middle East, by Emile Bustani ..... Apr 40
Canada's 1960—the Year of Gas, by Eric C. Sievwright ..... May 41
Coordinating Pemex, by Rafael Ortiz Mena ..... June 60
Libyan Turnbacks Watched ..... Feb 12
Mexico's Oil Laws, by Roscoe B. Gaither ..... June 76
Oil Is International (Editorial) ..... Apr 37
Oil—New Africa and Old Concessions, by Karol N. Gess ..... Feb 48
Paraguay Invites Oil Help, by Ricardo Mazo ..... Dec 47
Problems in Libya ..... Apr 44
Rebels and Oil in Algeria ..... Apr 42
The Power to Tax (Editorial) ..... Sept 41
U.S. Oil Import Controls—Good or Bad? by Joseph B. Huttlinger ..... July 54
Venezuela's Oil Decline, by Neal Van Middlesworth ..... Mar 39

MAPS (see also under Exploration)
Economics of Oil Transportation—Middle East to Western Europe, by Preston P. Nibley and Alan C. Nelson ..... Nov 56

MIDDLE EAST
A Blueprint for the Middle East, by Emile Bustani ..... Apr 40
A Role for OPEC, by Francisco R. Parra ..... Aug 28
Soviet Oil Threatens the Middle East, by Emile Bustani ..... Feb 41

NORTH AMERICA
Alberta's New Condensate Refinery Makes Visual Impact on Public, by W. C. Uhl ..... May 58
Canada's 1960—the Year of Gas, by Eric C. Sievwright ..... May 41
Canada's Oil and Gas Industry Now Faces Major Challenge, by W. C. Howells (Edit.) ..... May 39
Coordinating Pemex, by Rafael Ortiz Mena ..... June 60
Growing Impact of the Compacts on Motor Fuels in the USA, by William C. Uhl ..... Jan 52
Mexico's Oil Laws, by Roscoe B. Gaither ..... June 76
Natural Gas Dominant Factor in Canada's Petroleum Future, by Leslie O. Rowland .May 45
Pemex in Perspective (Editorial) ..... June 41
The Outlook for USA Petroleum Demand—1961, by V. B. Guthrie ..... Jan 43
U.S. Oil Import Controls—Good or Bad? by Joseph B. Huttlinger ..... July 54

PRICES
A Role for OPEC, by Francisco R. Parra ..... Aug 28
Russia's Oil Drive, by Gordon W. Reed ..Sept 54
The Pricing of Crude Oil ..... Nov 46

PRORATIONING
A Role for OPEC, by Francisco R. Parra ..... Aug 28
International Oil—its Ills and Cures, by Augustus C. Long ..... Jan 37

SOVIET BLOC
Future of Russian Oil ..... Sept 59
Russian Oil Exports—What to do? (Editorial) ..... Aug 27
Russia's Oil Drive, by Gordon W. Reed ..Sept 54
Soviet Oil Threatens the Middle East, by Emile Bustani ..... Feb 41

WORLD
ENI Operates World-Wide, by Enrico Mattei ..... Feb 37
1960 Demand 21,590,000 b/d ..... Jan 41
Oil Is International (Editorial) ..... Apr 37

Natural Gas

Canada's 1960—the Year of Gas, by Eric C. Sievwright ..... May 41
Gas Lights Europe's Hopes ..... Feb 66
"Mudpie" Provides New Method for Storing Liquefied Gases ..... Dec 48
Natural Gas Dominant Factor in Canada's Petroleum Future, by Leslie O. Rowland ..... May 45

Petrochemicals

EUROPE
Carrington—a Major New UK Petrochemical Center ..... Feb 60
Eastern European Process Plants Start Big Upswing, by Rudolf Sobotka ..... Refg 50
France's Refining Capacity Will Increase 25% by 1963, by Jacques C. Lamasse ..Refg 44
Italian Refining Continues Climb, by Alberto Girelli ..... Refg 46
The UK Oil Industry—1960, by Cecil W. Wood ..... Jan 45
UK Process Projects Emphasize Petrochemicals, by Cecil W. Wood ..... Refg 42
Wilton Polypropylene Plant Now Operating for ICI ..... Mar 64

FAR EAST
Oil's Important Place in Australia's Economy ..... Aug 45
Oil Will Supply Two-Thirds of Japan's Energy by 1960, by Masaya Ishii ..... Refg 48

NORTH AMERICA
Boom in Canada's Processing Centers on Gas and Sulfur, by William C. Uhl ....May 48
Mexico's Refining and Petrochemical Industry, by Cesar O. Baptista ..... June 53

PLANTS DESCRIBED
Boom in Canada's Processing Centers on Gas and Sulfur, by William C. Uhl ....May 48
Carrington—a Major New UK Petrochemical Center ..... Feb 60
Wilton Polypropylene Plant Now Operating for ICI ..... Mar 64
World's First Hydeal Unit Was Fast Construction Project ..... Dec 53

PROCESSES
Air Oxidation of Cyclohexane, by Peter W. Sherwood ..... Nov 78
New Markets Revive Petrochemical Propylene Oxide and Glycol, by Peter W. Sherwood ..... June 66
Recent Trends in Aromatic Chemicals, by Ralph Landau ..... Apr 56

PRODUCTS
Boom in Canada's Processing Centers on Gas and Sulfur, by William C. Uhl ....May 48
New Markets Revive Petrochemical Propylene Oxide and Glycol, by Peter W. Sherwood ..... June 66
New Technology Boosts Markets for Petrochemical Toluene, by Peter W. Sherwood Oct 56
Recent Trends in Aromatic Chemicals from Petroleum, by Ralph Landau ..... Apr 56

WORLD
Huge Petrochemical Barge Is Ready for Service ..... Aug 62
The World's Petrochemical Plants ..... Refg 94
World Refining Will Increase 31% by 1965, to 32.3 Million Barrels Daily, by William C. Uhl ..... Refg 40

Processing

CATALYSTS
How Catalysts Test Service Aids Fluid Unit Operations ..... Feb 45
Review of Recent USA Patents on Catalysts, by Heinz Heinemann and P. A. Leftancois Mar 68

EQUIPMENT
Contract Maintenance in Canada, by G. R. Henderson and John E. Miller ..... May 72
How a Computer Is Used to Plan Refinery Operations, by J. R. Jutras ..... Jan 54
How a Prefab Refinery Solved a Construction Problem in Guatemala ..... Mar 40
How to Revamp a Cracking Unit during a Turnaround, by William C. Uhl ..... Refg 60

EUROPE
Austrias Petroleum Industry, by J. W. Scott ..... Aug 40
BP's New Ruhr Refinery Now Onstream at Dinslaken, West Germany ..... Jan 48
Eastern European Process Plants Start Big Upswing, by Rudolf Sobotka ..... Refg 50
France's Refining Capacity Will Increase 25% by 1963, by Jacques C. Lamasse ..Refg 44
Italian Refining Continues Climb, by Alberto Girelli ..... Refg 46

(*Continued on page 92*)

'MIGHTY ANTAR'

"MIGHTY ANTARS" are in service in many parts of the world on civil engineering projects, in every phase of oil production and wherever there is a really big job to be done.
Illustrated above is one of a number shipped to Argentina for transporting heavy indivisible loads.

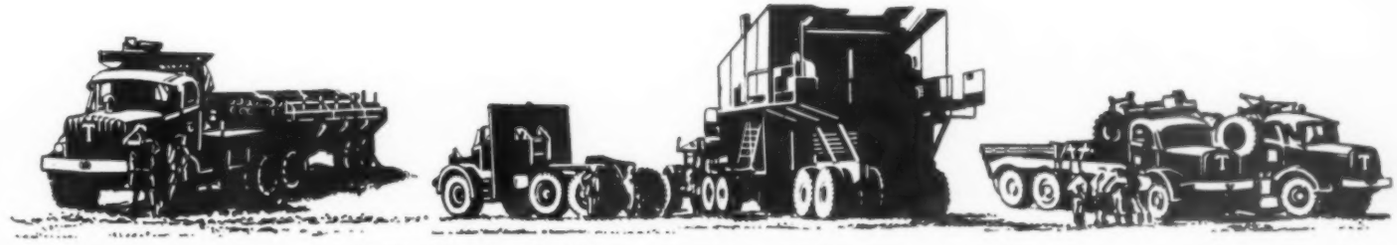
Long experience in meeting the demand for Specialised transport enables us to supply chassis expressly designed to fulfil operators' requirements in carrying capacity and performance over all types of terrain.

The Thornycroft range of chassis includes types for gross laden weights up to 224,000 lbs. (101,600 kgs.) and even higher under suitable road conditions.

4 x 4 and 6 x 6 "Nubian" chassis form the basis of fire-crash tenders for airfield use and together with "Big Bens," "Sandmasters" and "Mighty Antars" can be found in all parts of the world on Civil Engineering projects, Oilfield work from survey to end product—in fact, anywhere where specialised transport is the need.

THORNYCROFT

Builders of Specialised Transport



TRANSPORT EQUIPMENT [THORNYCROFT] LIMITED, BASINGSTOKE, HANTS. Basingstoke 1200

(*Continued from page 90*)

	Issue	Page
Milford Haven, Newest Refinery in the UK, Now Onstream, by Cecil W. Wood	Feb	50
New Austrian Refinery Now Onstream at Schwechat, by Rudolf Sobotka	Aug	38
100 Years of Refining in Salzbergen, Germany	Feb	56
Refining Capacity Continues Growth in West Germany, by Alfred M. Stahmer	Sept	64
The UK Oil Industry—1960, by Cecil W. Wood	Jan	45
UK Process Projects Emphasize Petrochemicals, by Cecil W. Wood	Refg	42
FAR EAST		
Oil's Important Place in Australia's Economy	Aug	45
Oil Will Supply Two-Thirds of Japan's Energy by 1980, by Masaya Ishii	Refg	48
LATIN AMERICA		
Esso's Golden Anniversary (in Argentina)	July	50
How a Prefab Refinery Solved a Construction Problem in Guatemala	Mar	40
NORTH AMERICA		
Alberta's New Condensate Refinery Makes Visual Impact on Public, by W. C. Uhl	May	58
Boom in Canada's Processing Centers on Gas and Sulfur, by William C. Uhl	May	48
Contract Maintenance in Canada, by G. R. Henderson and John E. Miller	May	72
How to Revamp a Cracking Unit during a Turnaround, by William C. Uhl	Refg	60
Mexico's Refining and Petrochemical Industry, by Cesar O. Baptista	June	53
Misconceptions about Mexico, by Carlos L. Corcuera	Sept	50
Stop Disaster!—Major Goal of Newest API Committee, by J. C. Ducommun	Apr	48
PATENTS		
Annual Review of USA Patents on Petroleum Refining and Processing, by Heinz Heinemann and P. A. Lefrancois	Refg	53
Review of Recent USA Patents on Catalysts, by Heinz Heinemann and P. A. Lefrancois	Mar	68
PLANTS DESCRIBED		
Alberta's New Condensate Refinery Makes Visual Impact on Public, by W. C. Uhl	May	58
Boom in Canada's Processing Centers on Gas and Sulfur, by William C. Uhl	May	48
How a Prefab Refinery Solved a Construction Problem in Guatemala	Mar	40
Milford Haven, Newest Refinery in the UK, Now Onstream, by Cecil W. Wood	Feb	50
New Austrian Refinery Now Onstream at Schwechat, by Rudolf Sobotka	Aug	38
New Mozambique Refinery Serves Southeastern Africa	Sept	80
100 Years of Refining in Salzbergen, Germany	Feb	56
WORLD		
A Word of Caution (Editorial)	Refg	39
The World's Processing Plants	Refg	67
World Refining Will Increase 31% by 1965, to 32.3 Million Barrels Daily, by William C. Uhl	Refg	40

Production

	Issue	Page
EUROPE		
Austria's Petroleum Industry, by J. W. Scott	Aug	40
LATIN AMERICA		
Bolivia Spurs Activity in Western South America, by Dr. Juan Rassmuss	Dec	40
Colombia's Oil Looks Up, by E. Ospina-Racines	Dec	36
Esso's Golden Anniversary (in Argentina)	July	50
Oil Today in Argentina, by Emilio L. Diaz	July	42
Pan American Operations Reach Peak (in Argentina)	July	47
Shell's Exploration Pushed (in Argentina)	July	52
Venezuela's Oil Decline, by Neal Van Middlesworth	Mar	39
NORTH AMERICA		
Canada's 1960—the Year of Gas, by Eric C. Sievwright	May	41
Injectivity Increases Result from Flood Water Carbonation	Apr	50
Mexico's Exploration Grows, by Antonio Garcias Rojas	June	42
Oil Is Vital to Mexico, by Pascual Gutierrez Roldan	Sept	42
RESERVES		
Reserves and Exploration, by J. P. Woods (Editorial)	Mar	35
TECHNOLOGY		
Injectivity Increases Result from Flood Water Carbonation	Apr	50
WORLD		
Reserves and Exploration, by J. P. Woods (Editorial)	Mar	35
World Crude Production Rising	Sept	49
World Crude Production Up 7.3% in 1960	Jan	40
RESEARCH & DEVELOPMENT		
Jersey Standard Conducts World-Wide Marine Research	Oct	46
Tanker Corrosion Prevention Progress	Oct	54
The Fuel Cell—Promise or Threat to the Oil Industry? by Eric Eltham.	Nov	73
SAFETY & TRAINING		
Australian Refinery Operators Will Use New Training Device	Dec	56
Stop Disaster!—Major Goal of Newest API Committee, by J. C. Ducommun	Apr	48
Unique Trainers to Aid Refiners	Apr	66

Transportation

	Issue	Page
PIPELINES		
Economics of Oil Transportation—Middle East to Western Europe, by Preston P. Nibley and Alan C. Nelson	Nov	56
Future of Russian Oil	Sept	59
Natural Gas Dominant Factor in Canada's Petroleum Future, by Leslie O. Rowland	May	45
Oil India Pipeline Starts	Apr	55
Pipeline Systems of Pemex, by Bruno Mascanzoni and F. Xavier Peredo	June	48
Winter No Longer Stops Pipe Line Construction (in Canada)	Oct	48
TANKERS & TERMINALS		
Better Harbor Facilities Needed—Now! (Editorial)	Oct	35
Economics of Oil Transportation—Middle East to Western Europe, by Preston P. Nibley and Alan C. Nelson	Nov	56
Huge Petrochemical Barge Is Ready for Service	Aug	62
Jersey Standard Conducts World-Wide Marine Research	Oct	46
Libya Enters the Oil Age	Dec	50
New Sea Terminal in Hawaii Can Handle Tankers of all Sizes	Oct	44
New UK Terminal at Angle Bay Designed for 100,000-Tonners	Oct	41
Tanker Corrosion Prevention Progress	Oct	54
The Case for the Bridge Aft Tanker	Oct	42
The Future of Suez, by Mahmoud Younes	Apr	38
World Tanker Fleet Growth Rate Continues to Decline	Oct	37

Geographical Index

Africa

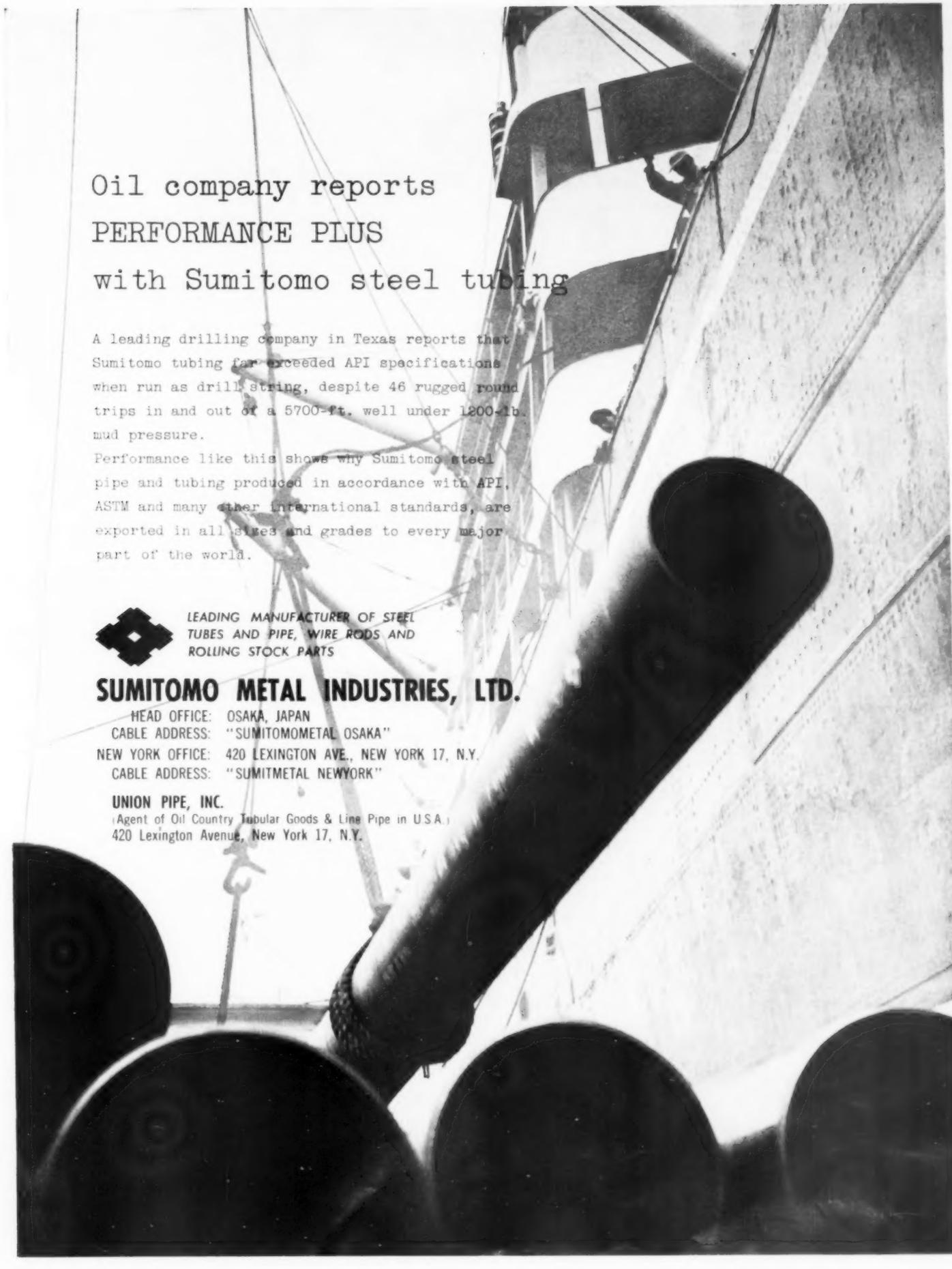
	Issue	Page
Central & South Africa	WPR	205
North Africa	WPR	187
Oil—New Africa and Old Concessions, by Karol N. Gess	Feb	48
Weight Dropping in North Africa, by Alan D. Waldie	Apr	47
ALGERIA (OCRS)	WPR	192
Rebels and Oil in Algeria	Apr	42
ANGOLA	WPR	205
BASUTOLAND	WPR	216
BECHUANALAND	WPR	214
BRITISH TOGOLAND	WPR	214
CAMEROONS (FRENCH)	WPR	205
CONGO (Leopoldville)	WPR	205
DAHOMEY	WPR	216
EGYPT	WPR	200
ERITREA	WPR	206
ETHIOPIA	WPR	206
FRENCH SAHARA (OCRS)	WPR	192
FRENCH SOMALILAND	WPR	216
GABON	WPR	206
GAMBIA	WPR	212
GHANA	WPR	206
GUINEA	WPR	216
IVORY COAST	WPR	208
KENYA	WPR	208
LIBERIA	WPR	208
LIBYA	WPR	188
Libya Enters the Oil Age	Dec	50
Libyan Turnbacks Watched	Feb	42
Problems in Libya	Apr	44
MADAGASCAR (MALAGASY REPUBLIC)	WPR	208
MALI REPUBLIC	WPR	210
MAURITANIA	WPR	216
MOROCCO	WPR	202
MOZAMBIQUE	WPR	208
New Mozambique Refinery Serves Southeastern Africa	Sept	80
NIGER	WPR	210
NIGERIA	WPR	210
NYASALAND	WPR	216
PORTUGUESE GUINEA	WPR	210
RHODESIA (NORTHERN)	WPR	216
RHODESIA (SOUTHERN)	WPR	216
SAO TOME & PRINCIPE	WPR	214
SENEGAL	WPR	212
SIERRA LEONE	WPR	216
SOMALI (REPUBLIC OF)	WPR	212
SOUTH AFRICA (UNION OF)	WPR	214
SOUTHWEST AFRICA	WPR	214
SPANISH GUINEA	WPR	212
SPANISH SAHARA (Rio de Oro)	WPR	212
Oil Search in the Spanish Sahara	Nov	52
SUDAN	WPR	214
SWAZILAND	WPR	216
TANGANYIKA	WPR	214
TOGOLAND	WPR	216
TRUCIAL COAST	WPR	219
TUNISIA	WPR	202
UGANDA	WPR	216
UNITED ARAB REPUBLIC		
The Future of Suez, by Mahmoud Younes	Apr	38
UPPER VOLTA	WPR	216
ZANZIBAR	WPR	212

Asia & Far East

	Issue	Page
AUSTRALIA	WPR	279
Australian Refinery Operators Will Use New Training Device	Dec	56
Oil's Important Place in Australia's Economy	Aug	45
BRITISH BORNEO	WPR	280
BURMA	WPR	280
CEYLON	WPR	281
CHINA (Communist)	WPR	276
FAR EAST	WPR	279
INDIA	WPR	284
Oil India Pipeline Starts	Apr	55
INDONESIA	WPR	281
JAPAN	WPR	285
Oil Will Supply Two-Thirds of Japan's Energy by 1980, by Masaya Ishii	Refg	48
KOREA (South)	WPR	281
LAOS	WPR	279
MALAYA	WPR	287
NEW CALEDONIA	WPR	279
NEW GUINEA	WPR	279
NEW ZEALAND	WPR	281
PAKISTAN	WPR	282
PAPUA	WPR	283
PHILIPPINES	WPR	286
SINGAPORE	WPR	279
TAIWAN	WPR	282
THAILAND (Siam)	WPR	283
TIMOR	WPR	284
VIETNAM	WPR	287

Europe

	Issue	Page
Eastern European Process Plants Start Big Upswing, by Rudolf Sobotka	Refg	50
Economics of Oil Transportation—Mid East to Western Europe, by Preston P. Nibley and Alan C. Nelson	Nov	56
Europe	WPR	37
Europe's Energy Supply—as seen by the OEEC	Aug	50
Gas Lights Europe's Hopes	Feb	66
U.S.S.R. & other Communist Countries	WPR	275
ALBANIA	WPR	275
AUSTRIA	WPR	44
Austria's Petroleum Industry, by J. W. Scott	Aug	40
New Austrian Refinery Now Onstream at Schwechat, by Rudolf Sobotka	Aug	38
BELGIUM	WPR	51
BULGARIA	WPR	275
CYPRUS	WPR	46
CZECHOSLOVAKIA	WPR	276
DENMARK	WPR	46
EIRE (Ireland)	WPR	48
ENGLAND	WPR	174
FINLAND	WPR	67
FRANCE	WPR	53
France's Refining Capacity Will Increase 25% by 1963, by Jacques C. Lamasse	Refg	44
French Seismograph Developments	Mar	60
GERMANY (EAST)	WPR	276
GERMANY (WEST)	WPR	69
BP's New Ruhr Refinery Now Onstream at Dinslaken	Jan	48



Oil company reports PERFORMANCE PLUS with Sumitomo steel tubing

A leading drilling company in Texas reports that Sumitomo tubing far exceeded API specifications when run as drill string, despite 46 rugged round trips in and out of a 5700-ft. well under 1200-lb. mud pressure.

Performance like this shows why Sumitomo steel pipe and tubing produced in accordance with API, ASTM and many other international standards, are exported in all sizes and grades to every major part of the world.

LEADING MANUFACTURER OF STEEL TUBES AND PIPE, WIRE RODS AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

HEAD OFFICE: OSAKA, JAPAN
CABLE ADDRESS: "SUMITOMOMETAL OSAKA"
NEW YORK OFFICE: 420 LEXINGTON AVE., NEW YORK 17, N.Y.
CABLE ADDRESS: "SUMITMETAL NEWYORK"

UNION PIPE, INC.
(Agent of Oil Country Tubular Goods & Line Pipe in U.S.A.)
420 Lexington Avenue, New York 17, N.Y.

(Continued from page 92)

	Issue	Page
100 Years of Refining in Salzbergen	Feb	56
Refining Capacity Continues Growth in West Germany, by Alfred M. Stahmer	Sept	64
Sixth World Petroleum Congress Planned for Frankfurt in 1963	Dec	39
GREECE	WPR	135
HUNGARY	WPR	276
ITALY	WPR	154
ENI Operates World-Wide, by Enrico Mattei	Feb	37
Italian Refining Continues Climb, by Alberto Girelli	Refg.	46
MALTA	WPR	67
NETHERLANDS	WPR	138
NORWAY	WPR	67
POLAND	WPR	276
PORTUGAL	WPR	146
ROMANIA	WPR	277
RUSSIA (USSR)	WPR	275
SICILY	WPR	146
SPAIN	WPR	162
SWEDEN	WPR	170
SWITZERLAND	WPR	173
UNITED KINGDOM	WPR	174
Carrington—a Major New UK Petrochemical Center	Feb	60
Milford Haven, Newest Refinery in the UK, Now Onstream, by Cecil W. Wood	Feb	50
New UK Terminal at Angle Bay Designed for 100,000-Tonners	Oct	41
UK Process Projects Emphasize Petrochemicals, by Cecil W. Wood	Refg.	42
Wilton Polypropylene Plant Now Operating for ICI	Mar	64
The UK Oil Industry—1960, by Cecil W. Wood	Jan	45
USSR	WPR	275
Russia's Oil Drive, by Gordon W. Reed	Sept	54
Russian Oil Exports—What to Do? (Editorial)	Aug	27
The Future of Russian Oil	Sept	59
YUGOSLAVIA	WPR	277

Latin America

Central America	WPR	255
South America	WPR	233
ARGENTINA	WPR	234
Drilling Progress by Southeastern	July	56
Esso's Golden Anniversary	July	50
High Hopes in Tierra del Fuego	July	44
Oil Today in Argentina, by Emilio L. Diaz	July	42
Pan American Operations Reach Peak	July	47
Shell's Exploration Pushed	July	52
YPF and Argentina's Oil, by Juan Jose Bruno (Editorial)	July	41
BAHAMA ISLANDS	WPR	255
BARBADOS	WPR	255
BOLIVIA	WPR	239
Bolivia Spurs Activity in Western South America, by Juan Rassmuss	Dec	40
BRAZIL	WPR	242
Disaster in Brazil (Editorial)	Feb	35
Link Reports on Brazil	Mar	36
Mapele Discovery Aids Brazil's Exploration	Dec	45
BRITISH GUIANA	WPR	239
BRITISH HONDURAS	WPR	256
CHILE	WPR	233
COLOMBIA	WPR	243
Colombia's Oil Looks Up, by E. Ospina-Racines	Dec	36
COSTA RICA	WPR	256
CUBA	WPR	256
DOMINICAN REPUBLIC	WPR	258
ECUADOR	WPR	245
EL SALVADOR	WPR	258
GUATEMALA	WPR	261
How a Prefab Refinery Solved a Construction Problem in Guatemala	Mar	40
HAITI	WPR	255
HONDURAS	WPR	258
JAMAICA	WPR	259
MEXICO	WPR	260
Coordinating Pemex, by Rafael Ortiz Mena	June	60
Mexico's Exploration Grows, by Antonio Garcias Rojas	June	42
Oil Is Vital to Mexico, by Pascual Gutierrez Roldan	Sept	42
Mexico's Oil Laws, by Roscoe B. Gaither	June	76
Mexico's Refining and Petrochemicals Industry, by Cesar O. Baptista	June	53
Misconceptions about Mexico, by Carlos L. Corcuera	Sept	50
Pemex in Perspective (Editorial)	June	41
Pipeline Systems of Pemex, by Bruno Mascanzoni and F. Xavier Peredo.	June	48
NETHERLANDS WEST INDIES	WPR	255
NICARAGUA	WPR	259
PANAMA	WPR	262
PARAGUAY	WPR	238
Paraguay Invites Oil Help, by Ricardo Mazo	Dec	47
PERU	WPR	246
PUERTO RICO	WPR	263
SURINAM (Dutch Guiana)	WPR	245
TRINIDAD	WPR	263
URUGUAY	WPR	254
VENEZUELA	WPR	248
Venezuela's Oil Decline, by Neal Van Middlesworth	Mar	39

Middle East

Economics of Oil Transportation—Middle East to Western Europe, by Preston P. Nibley and Alan C. Nelson	Nov	56
Middle East	WPR	219
Soviet Oil Threatens the Middle East, by Emile Bustani	Feb	41
The Future of Suez, by Mahmoud Younes	Apr	38
ABU DHABI	WPR	219
ADEN	WPR	219
AFGHANISTAN	WPR	219
BAHRAIN	WPR	219
IRAN	WPR	221
IRAQ	WPR	226
ISRAEL	WPR	220
JORDAN	WPR	219
KUWAIT	WPR	227
LEBANON	WPR	230
MUSCAT and OMAN	WPR	219
NEUTRAL ZONE	WPR	230
QATAR	WPR	227
SAUDI ARABIA	WPR	230
SYRIA	WPR	231
TURKEY	WPR	222
YEMEN	WPR	231

North America

North America	WPR	267
ALASKA	WPR	267
CANADA	WPR	274
Alberta's New Condensate Refinery Makes		
Visual Impact on Public, by W. C. Uhl	May	58
Arctic Piercement Structures	May	67
Boom in Canada's Processing Centers on Gas and Sulfur, by William C. Uhl	May	48
Canada's Exploration—1960	May	52
Canada's Oil and Gas Industry Now Faces Major Challenge, by W. C. Howells (Editorial)	May	39
Canada's 1960—the Year of Gas, by Eric C. Sievwright	May	41
Contract Maintenance in Canada, by G. R. Henderson and John E. Miller	May	72
How a Computer Is Used to Plan Refinery Operations, by J. R. Jutras	Jan	54
How Air and Gas Drilling Cut Costs at Two Foothills Wells	May	68
How to Revamp a Cracking Unit during a Turnaround, by William C. Uhl	Refg.	60
Natural Gas Dominant Factor in Canada's Petroleum Future, by Leslie O. Rowland	May	45
Winter No Longer Stops Pipe Line Construction	Oct	48
UNITED STATES	WPR	268
Annual Review of USA Patents on Petroleum Refining and Processing, by Heinz Heinemann and P. A. Lefrancois	Refg.	53
Growing Impact of the Compacts on Motor Fuels in the USA, by William C. Uhl	Jan	52
How Catalyst Test Service Aids Fluid Unit Operations	Feb	45
Huge Petrochemical Barge Is Ready for Service	Aug	62
Injectivity Increases Result from Flood Water Carbonation	Apr	50
"Mudpie" Provides New Method for Storing Liquefied Gases	Dec	48
Needed—More Understanding, by M. J. Rathbone (Editorial)	Nov	45
New Sea Terminal in Hawaii Can Handle Tankers of All Sizes	Oct	44
New Uses, Wider Markets Open for Old, Established Products, by V. B. Guthrie	Nov	66
Offshore Technique Improving, by James W. Calvert	Sept	70
Review of Recent USA Patents on Catalysts, by Heinz Heinemann and P. A. Lefrancois	Mar	68
Stop Disaster!—Major Goal of Newest API Committee, by J. C. Ducommun	Apr	48
The API Meets in Chicago	Nov	51
The Outlook for USA Petroleum Demand —1961, by V. B. Guthrie	Jan	43
The Power to Tax (Editorial)	Sept	41
USA Product Demand Will Rise 3.2%	Nov	70
U.S. Oil Import Controls—Good or Bad? by Joseph B. Huttlinger	July	54
World's First Large Hydeal Unit was Fast Construction Project	Dec	53

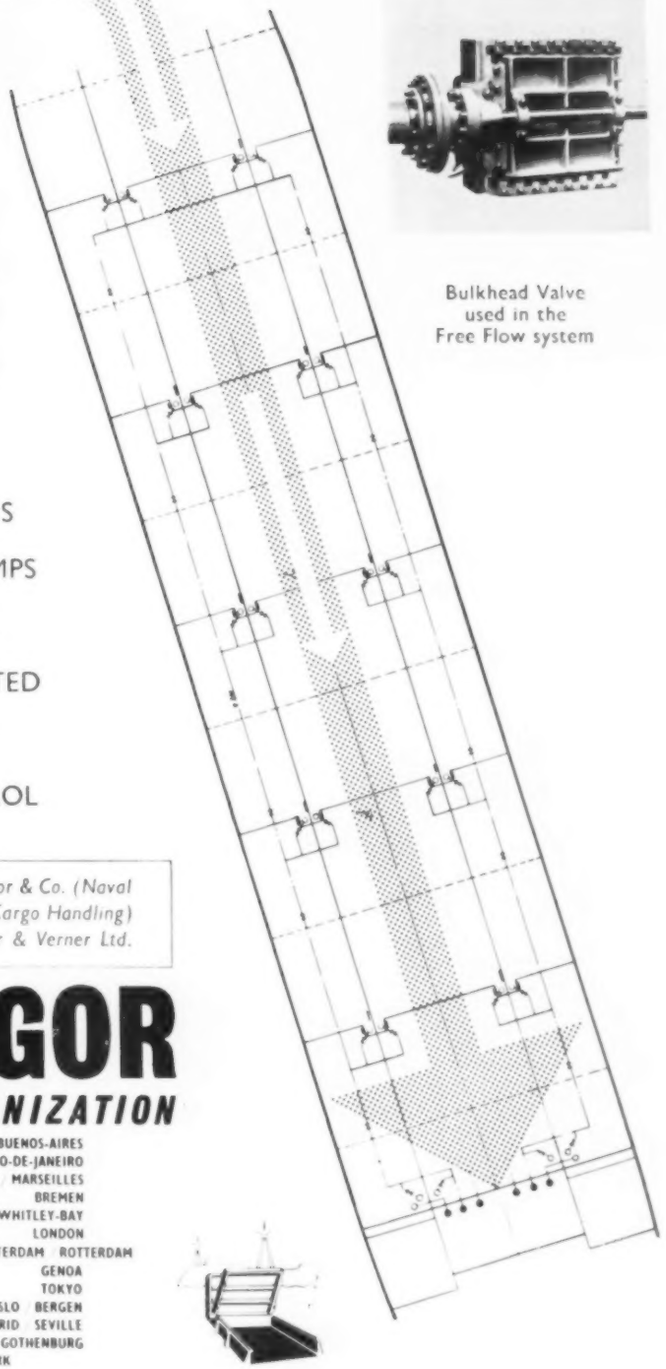
World

A Role for OPEC, by Francisco R. Parra	Aug	28
A Word of Caution (Editorial)	Refg.	39
Air Oxidation of Cyclohexane, by Peter W. Sherwood	Nov	78
Better Harbor Facilities Needed—Now! (Editorial)	Oct	35
Free World Geophysical Activity—1960	Aug	32
How Much Is Too Much? (Editorial)	Jan	35
International Oil—its Ills and Cures, by Augustus C. Long	Jan	47
International Rig Report Hits Peak	Aug	34
Jersey Standard Conducts World-Wide Marine Research	Oct	46
New Markets Revive Petrochemical Propylene Oxide and Glycol, by Peter W. Sherwood	June	66
New Technology Boosts Markets for Petrochemical Toluene, by Peter W. Sherwood	Oct	56
New Tools for the Geophysicist	Mar	49
1960 Demand 21,590,000 b/d	Jan	41
Oil Is International (Editorial)	Apr	37
Recent Advances in Logging Techniques, the Sonic Log, by C. A. Doh and L. A. Puzin	Mar	43
Recent Trends in Aromatic Chemicals from Petroleum, by Ralph Landau	Apr	56
Reserves and Exploration, by J. P. Woods (Editorial)	Mar	35
The Fuel Cell—Promise or Threat to the Oil Industry? by Eric Eltham	Nov	73
The Pricing of Crude Oil	Nov	46
The World's Petrochemical Plants	Refg.	94
The World's Processing Plants	Refg.	67
World's Crude Production Rising	Sept	49
World Crude Production Up 7.3% in 1960	Jan	40
World Exploration Review	Mar	42
World Oil Demand in 1961 Will Rise to over 23 million Barrels Daily	Sept	46
World Refining Will Increase 31% by 1965, to 32.3 Million Barrels Daily, by William C. Uhl	Refg.	40
World Review	WPR	19
World Tanker Fleet Growth Rate Continues to Decline	Oct	37

S.I.G.M.A.-A.F.O.

FREE FLOW

SYSTEM OF CONSTRUCTION ELIMINATES MAIN PIPING



Bulkhead Valve used in the Free Flow system

NOTE THESE ADVANTAGES

NO MAIN PIPING IN TANKS
*
INCREASED OUTPUT OF PUMPS
*
REDUCED MAINTENANCE
*
STRIPPING ALMOST ELIMINATED
*
INCREASED DEADWEIGHT
*
HYDRAULIC REMOTE CONTROL OF VALVES

In the U.K. promoted jointly by MacGregor & Co. (Naval Architects) Ltd., and MacGregor & Co. (Cargo Handling) Ltd., in conjunction with Eggar, Forrester & Verner Ltd.

MacGREGOR

INTERNATIONAL ORGANIZATION

ARGENTINA	MacGREGOR ARGENTINA S.R.L.	BUENOS-AIRES
BRAZIL	MacGREGOR DO BRASIL S.A.	RIO-DE-JANEIRO
FRANCE	MacGREGOR - COMARAIN S.A.	PARIS / MARSEILLES
GERMANY	DEUTSCHE MacGREGOR G.M.B.H.	BREMEN
GT. BRITAIN	MacGREGOR & Co (NAVAL ARCHITECTS) LTD	WHITLEY-BAY
GT. BRITAIN	MacGREGOR & Co (CARGO HANDLING) LTD	LONDON
HOLLAND	MacGREGOR - COMARAIN - HOLLAND N.V.	AMSTERDAM ROTTERDAM
ITALY	MacGREGOR - COMARAIN S.A.	GENOA
JAPAN	MacGREGOR FAR EAST LTD	TOKYO
NORWAY	NORSK MacGREGOR A.S.	OSLO BERGEN
SPAIN	ELCANO MacGREGOR	MADRID SEVILLE
SWEDEN	ANKERLOKKEN MacGREGOR AB	GOTHENBURG
U.S.A.	MacGREGOR COMARAIN INC.	NEW-YORK

INDUSTRIAL TRAILERS

complete camp facilities!

ALL TYPES

RENTALS SALES

northland camps inc.

IMMEDIATE DELIVERY

USE ATCO'S "ONE-STOP SERVICE"

Design — Construction — Transportation — Site Preparation — Food Service

For complete details write or call collect Department "K"

IN CANADA
ALBERTA TRAILER CO. LTD.
805 - 3rd STREET N.E. CALGARY

IN MIDDLE EAST
SPINNEY'S (1948) LTD.
P.O.B. 746 BEIRUT, LEBANON

NORTHLAND CAMPS INC.

602 WASHINGTON BLDG., SEATTLE

Washington Pipeline

(*Continued from page 5*)

Colorado and its ally, El Paso Natural Gas Co. of El Paso, Texas, have a leg up on the horse in a conditional approval by the Federal Power Commission. But Tennessee is trying to unseat it in a reopened hearing.

Clyde Hargrove, counsel for two Tennessee subsidiaries, which plan their own line from Texas, through Mexico and up to Los Angeles, is throwing out questions about Colorado and the antitrust laws.

He brought out that Colorado bought 8,013 shares of founders stock in Pacific Northwest Pipeline Corp. in 1955 for $8.57 a share against the going market price of $21.

He raised questions about tie-ins between Pacific, Colorado, El Paso, West Transmission Co., Ltd. of Canada, Eastman, Dillon and Co. and Union Securities Corp. He threw in the names of Albert Glassell, Jr., a director of El Paso; W. E. Mueller, president of Colorado; and Joseph H. King, a director of El Paso. He asked the FPC hearing to subpoena Mueller and King to the witness stand, if they did not come voluntarily.

He moved into lower ground by asking if Pacific had told the Internal Revenue Service about the "gift" of founder's stock; if the Securities and Exchange Commission had been told of the deal; and he offered to put up bond to pay witness fees to Mueller and King.

Colorado officials accussed Tennessee of trying to delay the hearing by "a witch hunt" and "a subterfuge" that is "ludicrous and frivolous."

They said the Pacific stock bought by Colorado has been exchanged for about 16,000 shares of El Paso stock, and that it represents only seven-one hundreds of one per cent of all El Paso stock outstanding.

The examiner agreed, however, to bring in Mueller and King.

Oil Imports Hearings Begin

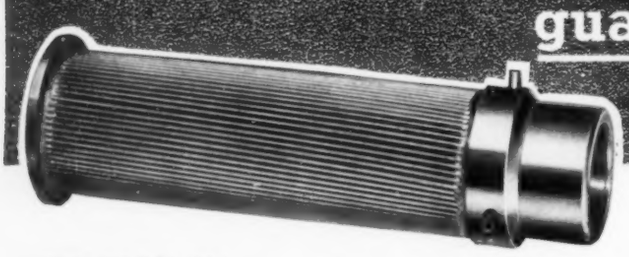
The Steed subcommittee on oil imports is bearing down on two points in its hearings that began Nov. 20. Hearings are by a House Small Business subcommittee under Rep. Tom Steed, D., Okla., as chairman.

First, the subcommittee is trying to measure the economic health of U. S. producers and refiners, including changes in numbers of jobs and numbers of producers and refiners, with reasons for the changes. Second, it is trying to gauge the ability of oil to step up output to meet demands of war or peace, and the time needed to reach top output. Any witnesses urging more or less oil imports are being quizzed for facts to back up their suggestions.

Motor Fuel Use Rise Seen

Motor fuel use this year will reach 64.9 billion gallons, a gain of 2.6% over 1960, it is reported by the U. S. Bureau of Public Roads. The gain is less than the 2.7% a year ago, and the smallest in many years. Highway use of motor fuel will be 59.4 billion gallons, also up 2.6%, including 56.7 billion gallons of gasoline and 2.7 billion of special fuels as diesel and butane. Nonhighway use will be 5.5 billion. Average motor fuel per highway vehicle will be 781 gallons.

Vokes new filter media with guaranteed 100% efficiency



POROLOY CM.

Vokes now introduce a new all metal filter medium of outstanding efficiency for the *controlled* filtration of hydraulic and lubricating oils, fuels, air, gases, acids, caustics and related caustic materials, chemicals and solvents at extreme temperatures and pressures. Poroloy CM filter elements can be made in any size or shape from a variety of metals—Stainless Steel, Inconel, Nickel, Copper, Steel and Nichrome being the most popular—features which, combined with special production techniques to give controlled pore configuration, enable filters to be individually designed for special applications. Metals can be selected with the particular requirements of the application in mind and the size of the pores can be controlled to deal with particles of between 2 and 250 microns. Poroloy CM filters are therefore 100% effective against a stated particle size, *the danger of media migration being eliminated by an accurately controlled sintering process.* The ultimate tensile strength of the elements varies from 2,000 to 60,000 p.s.i. and the operating temperature range is from —400°F to 1200°F.

The unique combination of properties found in Poroloy CM has led to its recent use in critical temperature conditions in the United States missile and aircraft industries, including installation in the Boeing 707.

POROLOY T.

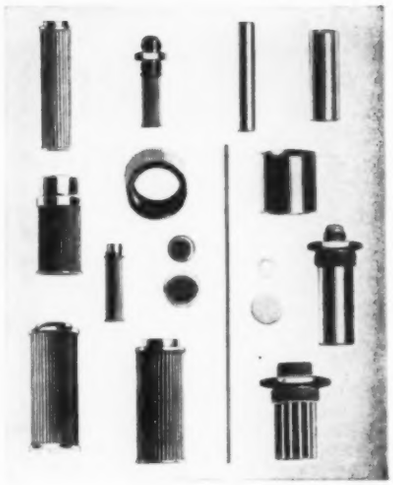
Similar in performance to Poroloy CM but manufactured by a different process, Poroloy T has an operating temperature range from —400°F to 1500°F. Pore size ratings are from 2 to 250 microns and tensile strength varies from 2,000 to 100,000 p.s.i.

This illustration shows the many sizes and forms—seamless tubes, flat discs, corrugated elements etc.—in which Poroloy can be manufactured.

Both filter elements are manufactured in conditions of micro-cleanliness and before despatch are individually checked for performance in bubble point testing equipment.

Poroloy was developed by the California Institute of Technology and is manufactured in the U.K. under license from The Bendix Corporation, U.S.A.

Write now for fully illustrated technical literature.



VOKES

VOKES LIMITED • HENLEY PARK • GUILDFORD • SURREY

Telephone: Guildford 62861 (6 lines). *Telex:* 8-535 Vokesacess, Guildford. *Grams & Cables:* Vokesacess, Guildford, Telex.
Vokes Australia Pty. Ltd., Sydney. Represented throughout the World.

V.332

Supply Company Personnel Changes

Loffland Brothers Co., Tulsa—W. Jess Price, formerly manager of European operations, elected vice president and general manager—Eastern Hemisphere, and continuing to headquarter in The Hague, Netherlands. J. Wayne Burris to assistant general manager—Eastern Hemisphere, continuing in Benghazi, Libya. John M. Reynolds to chief engineer—Eastern Hemisphere, also in Benghazi.

E. L. Ross

O. Thompson

Geolograph Oil Field Services, Oklahoma City—Otto Thompson, public relations director, to member of the board of directors; and Edward L. Ross, district manager in Colorado, to general sales manager.

A. O. Smith International S.A., Milwaukee—Albert W. Rouse, from Houston where he specialized in oil and petrochemicals, to product manager for fluid measuring equipment for this export subsidiary of A. O. Smith Corp.

Joy Manufacturing Co.—Karl W. Priester to export sales staff, representing the Baash-Ross Division, with headquarters in New York City.

McCullough Tool Co., Los Angeles—Jim Edwards to coordinator—logging and radiological safety—Don Prehoda to sales and service manager of the Mountain Division, and G. D. Wiley to sales supervisor of that division.

Oil Well Supply Division of U. S. Steel Corp., Dallas—Michael F. Hazel to president, succeeding Fred F. Murray, who retired October 31. Hazel, with Oil Well Supply since 1930, had been executive vice president.

M. F. Hazel

D. M. Krausse

Dresser Industries, Inc.,—Dan M. Krausse, formerly senior vice president, Cosden Petroleum Co., Big Springs, Texas, to vice president, with primary responsibilities for Dresser companies in oil and gas drilling equipment and services.

Beckman Instruments, Inc., Fullerton, Calif—Robert B. Sankey, from sales engineer in Boston, to product line manager for the scientific and process instruments division, in Fullerton.

Babcock & Wilcox Co.—Joseph Delano Hitch, Jr., to general manager, international sales of the boiler division, in New York City. Hitch is former president and board chairman of Dorr-Oliver Inc., with more than 35 years of experience in international operations.

Cooper-Bessemer Corp., Mt. Vernon, Ohio—John S. Tonetti, from design engineer, to assistant manager, gas turbine sales.

Security Engineering Division, Dresser Industries Inc., Dallas—Arthur S. Marshall to vice president—marketing.

Dowell Division of Dow Chemical Co., Tulsa—Ralph H. Smith, director sales since 1953, to vice president and member of the board.

R. H. Smith

R. W. Warren

Chicago Bridge & Iron Co.—R. W. Warren, from the foreign sales department in New York City, to manager of sales for Germany, Holland and Italy, with offices initially in The Hague, Netherlands, and later in Germany.

Taylor Instrument Cos., Rochester, N. Y.—Philip E. Gilman to manager, export division of industrial sales, a newly formed division; and William J. Berk in charge of a new petro-chemical division.

Porta-Kamp Mfg. Co., Houston—John F. Herold to vice president in charge of sales, world-wide; and Clarence K. Vincent to vice president of manufacturing.

New Booklet on Du Pont "Delrin"

A recent booklet prepared by Du Pont gives case history information on 31 typical early installations of oil field pipe made from "Delrin" acetal resin. The histories cover applications by both large and small producers in nine states. Included are flow lines, gathering lines, water flood lines, and salt water disposal lines. Requests should be sent to Room N-2507P, Polychemicals Department, Du Pont Co., Wilmington 98, Del.

P.L.4. An 80 ft. Express Passenger Launch with Napier Deltic 18-cylinder Diesels supplied to Shell Tankers Ltd. with a speed of 37 knots, and now in use on Lake Maracaibo.

FOR PROBLEMS REQUIRING SPECIALISED KNOWLEDGE & EXPERIENCE
STEEL, WOOD & ALLOY DESIGN AND CONSTRUCTION
LIGHTWEIGHT ELECTRICAL EQUIPMENT
WELDED ALUMINUM & STEEL TANKS
ROLL DAMPING EQUIPMENT

VOSPER
LIMITED
SHIPBUILDERS & ENGINEERS,
PORTSMOUTH, ENGLAND

D. Anderson & Sons Ltd. 98
John Newton (Publicity) Ltd.

Associated Electrical Industries Ltd. 22
Technical & General Advertising Ltd.

Axelson-Garrett, Div. of U. S. Industries, Inc. 72
Glenn Mason, Cunningham & Associates

Badger Manufacturing Co. 12-13
F. P. Walther Jr. & Associates, Inc.

Bechtel Corp. 15
Erwin Wasey, Ruthrauff & Ryan, Inc.

British Ermeto Corp., Ltd. 71
A. T. A. Advertising, Ltd.

The British Petroleum Co., Ltd. 65
S. H. Benson Ltd.

Peter Brotherhood Ltd. 26
J. Peers & Associates

The David Brown Corp. (Sales) Ltd. 78
Celricha Advertising Ltd.

Brown Drilling Co. 66
Jakobsen Advertising Agency

Byron Jackson Tools, Inc., A subsidiary of Borg-Warner Corp. Cover III
John Ramsey Company, Advertising

California Texas Oil Co. 6
Gaynor & Ducas, Inc.

Cameron Iron Works, Inc. Cover II
Boone and Cummings

Cape Insulation and Asbestos Products Ltd. 75
Taylor Advertising Ltd.

Chicago Bridge & Iron Co. 29
Ladd, Southward & Bentley, Inc.

Chicago Pneumatic, Oil Tool Div. 58-59
G. M. Basford Co.

Chiksan Co. 33
Rives, Dyke & Co.

Cities Service Oil Co. 55
Lennen & Newell, Inc.

Clark Bros. Co., One of The Dresser Industries 16
Persons Advertising, Inc.

Crane International 52
National Export Advertising Service, Inc.

Davison Chemical Div., of W. R. Grace & Co. 77
VanSant Dugdale & Co., Inc.

ADVERTISERS' INDEX

(Advertising Agencies in Italics)

Davey, Paxman & Co., Ltd. 74
Industrial Publicity Ltd.

G. Dikkers & Co. N. V. 9

Dowell Schlumberger Corp. Cover IV
Rives, Dyke and Co.

Dryden-East Hotel 30
Daniel & Charles, Inc.

E. I. du Pont de Nemours & Co., Inc. 11
The Rumrill Co., Inc.

English Electric Co., Ltd. 14, 63
Technical Advertising Service Ltd.

Ethyl Corporation 1
Reach, McClinton & Co.

Gardner-Denver Company 60-62
Glenn Mason, Cunningham & Assoc.

The Geolograph Co. 4
Lowe Runkle Co.

Grove Valve & Regulator Co. 23
L. C. Cole Co., Inc.

The Guiberson Corp. 27
Cunningham, Cooper & Assoc.

Matthew Hall & Co. Ltd. 87

Halliburton Company 34
Glenn Advertising, Inc.

Haney and Williams Drilling Co. 86
Creative Advertising

Frederic R. Harris Inc. 10

Hawker Siddeley Engineering 32
Batten, Barton, Durstine, & Osborn Ltd.

Herb J. Hawthorne Inc. 20
Robinson-Gerrard-McGary, Inc.

Hercules Tool Co. 83
Keefe Advertising Agency

Imperial Ethiopian Government 82

Ketjen N. V. 7
Ruedt en Baet

The Lummus Company 2, 5
G. M. Basford Co.

McCullough Tool Co. 89
Raymond O. Perry, Advertising

MacGregor International Organization 95
Seal Publicity Ltd.

Manning, Maxwell & Moore, Inc. 67
Fuller & Smith & Ross, Inc.

Milwhite Mud Sales Co. 73
Boone & Cummings

Northland Camps Inc. 96
Nuttall & Mahoney Ltd.

Claudius [illegible] A. G. 85

Petrolite Corporation 21
Batz-Hodgson-Neuucchner, Inc.

Pont-A-Mousson 79-81

Porta-Kamp Manufacturing Co., Inc. 4
Troxell & Associates, Advertising

Procon, Inc. 25
Tobias, O'Neil & Gallay, Inc.

Santa Fe Drilling Co. 84
Dozier Eastman & Co.

Schlumberger Surenco 51
Rives, Dyke & Co.

Socony Mobil Oil Co., Inc. 18-19
Abril Lamarque Advertising

Standard Oil Company (New Jersey) 24
McCann-Erickson, Inc.

Sumitomo Metal Industries, Ltd. 93
Dentsu Advertising Ltd.

Transport Equipment (Thornycroft) Ltd. 91
Crane Advertising Ltd.

U. S. Rubber International (Great Britain) Ltd. 76
Robert Freeman Co., Inc.

Universal Oil Products Co. 68-69
Tobias, O'Neil & Gallay, Inc.

Universal Oil Products Co., Products Dept. 17
Tobias, O'Neil & Gallay, Inc.

Vokes Ltd. 96
Trowbridge Pritchard & Co., Ltd.

Vosper Ltd. 97
William Dawson & Sons Ltd.

Wilson Supply Co. 31
Craig & Associates, Advertising

Perfection in Protection

Anderson have pioneered outer wrap materials for pipelines using both asbestos and glass fibre bases for use with either coal tar enamels or asphaltic bitumens.

Thermoglas and Bestos pipeline outer wraps have met fully the requirements of major contracts both at home and overseas with such characteristics as strong adhesion and high tensile strength.

THERMOGLAS

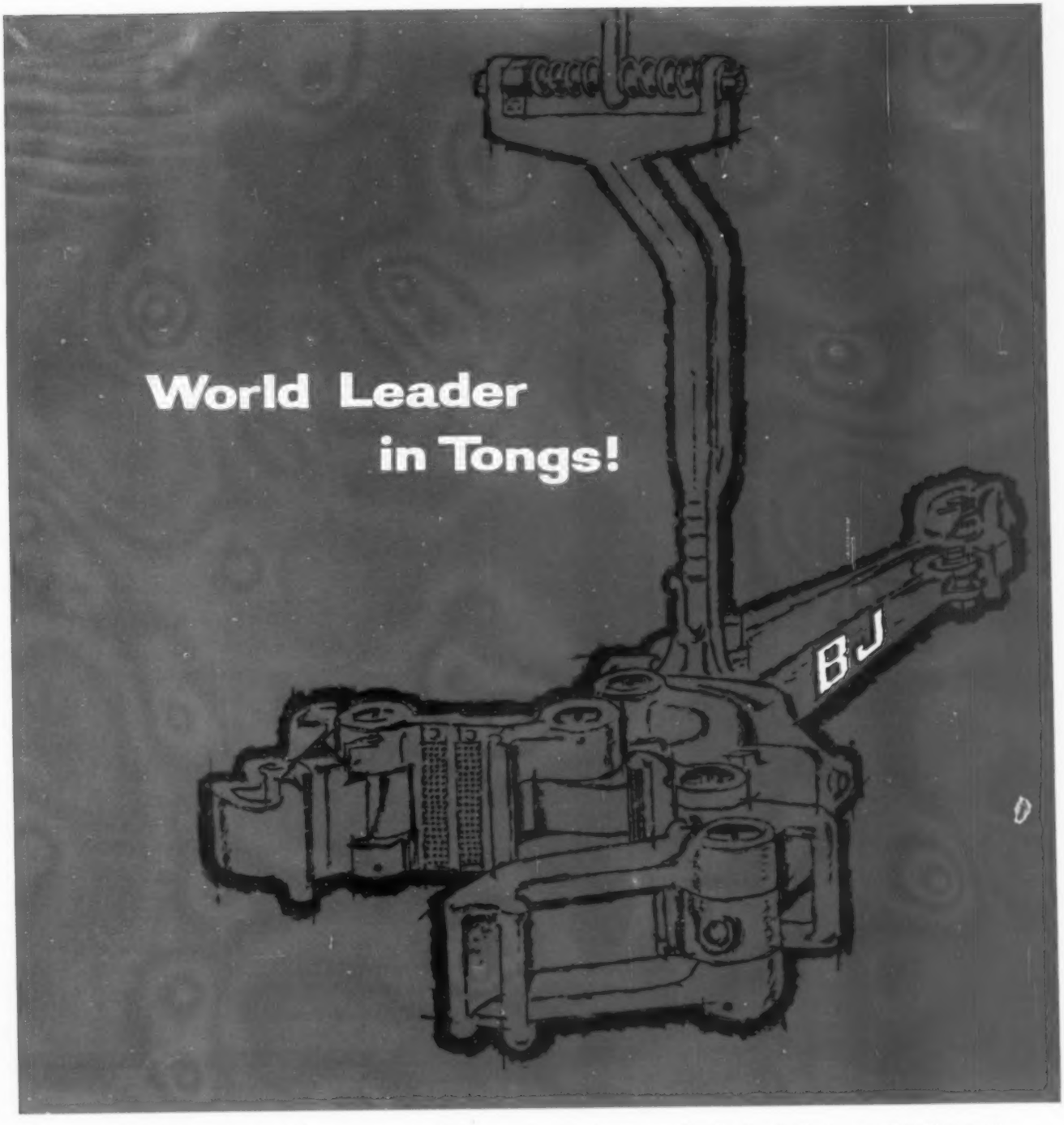
PIPELINE OUTER WRAP

Full technical information from:

D. ANDERSON AND SON LTD.

Stretford. Manchester Tel: LONgford 4444.

Old Ford. London E3. England Tel: AMHerst 9381.



BJ Tongs, with their famous "gooseneck" hangers, are known and preferred by field crews the world over. An exclusive BJ feature, the patented gooseneck hanger allows quick adjustment—both lateral and longitudinal—for perfect operating balance. Made of heat-treated alloy steel, these superior tongs are precision machined for longer wear, easier operation. Stronger, too. Lube fittings are recessed, permitting solid, large-diameter hinge pins. Hinge pin holes are flame-hardened for longer operating life. Heavier jaw construction allows application of greater torque to meet the most severe operating conditions. Performance? There are far more BJ Tongs in use than any other make—proof that BJ quality does cost less in the long run. Available in a wide range of types and sizes to handle all drill pipe, casing and tubing OD's. BJ also offers the only complete line of power-driven tongs. Your BJ Field Representative has full details—or see your local supply store.

MANUFACTURED IN MEXICO...

Byron Jackson S.A., Plaza de la Republica 9-106, Mexico D.F., has been manufacturing BJ Oil Tools and Centrifugal Pumps since 1954.

Byron Jackson Tools, Inc.
A SUBSIDIARY OF BORG-WARNER CORPORATION
P.O. Drawer 2198, Houston 1, Texas

BW
BORG-WARNER

one source

for the Services of both Dowell and Johnston Testers!

CEMENTING

FRACTURING

ACIDIZING

DRILL STEM TESTING

SPECIALIZED SERVICES AND PRODUCTS

In France and the Sahara area—
COSERVICES

In Venezuela and Argentina—
DOWELL SERVICES, S.A.

In Germany—
DOWELL SCHLUMBERGER GMBH

or write Dowell Schlumberger Corporation, 17, Place des Etats-Unis, Paris 16, France